

COAL AGE

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Wanted: A Leader

CONSUMERS are in great need of safe leadership, some outstanding coal purchaser who by his timely purchases and abstentions from the market will prevent hit-and-miss buying. The railroad companies now are the real leaders. When the Pennsylvania R.R. starts to buy and stock coal the word goes around and industry buys. But the leadership of the railroads is not safe. It is liable to bring industry into trouble. The railroads have power to get coal and get it at a low price which is not vouchsafed to the ordinary buyer. The purchasing agent of the railroad does not need to be so circumspect as he does in other industries. He can afford to wait a little longer.

The United States Steel Corporation might serve as such a leader did it not have its own mines. In consequence of that ownership, its action always is believed to have reference to its own internal policy, its own capacities of production and not to the main problems of a possible general shortage of coal. Many other industries including the railroads have their own mines, so the smaller manufacturer has no leading industry to dictate his policy. Were there such an industrial leader who could appoint agents to ascertain the facts and direct his action, we might find the public better apprized. As it is no one seems able to lead, the Department of Commerce, the U. S. Geological Survey, the members of the defunct U. S. Coal Commission, the American Engineering Council, the National Coal Association or the United Mine Workers of America, because they merely advise, and industry has to expend money when it follows their advice. When a coal consumer buys he puts money back of his judgment. And money talks.

Rock Dusting

NO EXCUSE will serve for those who are found next winter with their mines unprotected by rock dust. Those operators who have mine explosions in the coming cold season will have a difficult time reconciling their consciences and satisfying the mining departments and the public. Coal men are always deprecating the multitude of statutes passed for their direction and admonishment. Here is a chance to prove that the industry follows the higher law and does not wait for legislative action.

The insurance companies are doing their part. What is the industry doing? Certainly not as much as needs to be done and done quickly. When the laws are passed let them come into effect promptly, for rock dusting has been proved almost as cheap as it is efficacious. The improvements in the mines of the Utah Fuel Co. are an instance of aggressive safety work. That company is reported as making every effort to make its ill-fated mine safe both with water as a preventive at the face and rock dust as a localizer of explosions. Its action should be an exemplar to other companies. Attack

explosions at the source and arrange to trap them if all else fails.

More rock-dusting equipment companies should enter the field. The industry needs them, but operators should not forget that equipment is not readily obtainable and so should enter the field early. They should not leave the problem till it is too late to get supplies for the protection of their mines this winter.

Do your Christmas shopping early and prove to your men that you have their safety at heart.

You'd Be Surprised!

A COAL mining man can get pretty much down in the mouth these summer days if he simply sits at home and looks at the "no bills" rusting to the track down by the quiet tippie. But if he were roaming around from Bellingham to Birmingham he wouldn't feel so bad. He would continually stumble upon somebody working out the salvation of the coal industry. He would be surprised and then interested and then enthused over the vast amount of thought and ingenuity that are busily producing new devices and methods for getting out coal cheaply.

It is going on everywhere. Probably no other year in the history of coal mining has been so active in this particular. It is well known that great progress has been made in West Virginia in the loading out of coal by conveyor. Devices for both cutting and loading coal are developing there, thanks to the absence of Mr. Lewis' benign influence. Something has been said about a good many of them. But there are developments elsewhere, too, though the developers of necessity are keeping their lights hid under a bushel. They are not deliberately courting trouble with the union.

It is little known that an immense scraper loader for use on long straight working faces has practically attained success in a western mine. It is less known that a shuttle-loader on wheels is about ready for practical operation. It will journey back and forth along a face delivering coal into a trip at the middle point of its course, thus enabling a few men to get out a big daily tonnage with a remarkably low power consumption. Hardly anybody hears about a new system of mining adapted to a novel type of scraper now getting its finishing touches. Not much is known of several new mine layouts calculated to overcome the obstacles of transportation behind standard loading machines. Yet all these ideas are far beyond the paper-model stage. They are succeeding. And many another idea is obtaining its full measure of success, hidden away in the mines of this country waiting for its time to pop into the light. You'd be surprised!

Despite much stumbling, mechanical loading will be solved for all reasonable conditions. We are well beyond the Kitty Hawk stage of development. Hereafter progress should be rapid. So much cogitating and testing cannot fail of ultimate success.

What To Do? What To Do?

WHEN it comes right down to it, almost everybody has a direct interest in the welfare of coal. Events in Illinois prove that, these days, when we see the state itself rising in defense of its industry. The butcher, the baker and the candlestick maker in average times can gain great self-satisfaction by rub-a-dubbing in their own little tub about how the "cut-throat" miner and the "baron" operator are scheming to hold up the people. But when an insufferable situation with widespread unemployment, political uneasiness and lack of business in the mines is hung like a stone about the neck of the coal industry, so as to begin to cause distress in the butcher shop, the bakery and the candlestick foundry, then the suffering industry becomes "our industry" and we all rise most indignantly though belatedly to defend it.

In Herrin, down in the heart of the great southern Illinois producing field, there are so many hungry families and unpaid bills that on August 20 a public mass meeting is to be held. The people of Williamson County want to find out exactly what causes this travail and what can be done to relieve it. They propose to have a popular "economic conference"—although they don't call it that—where the best men among miners, operators and business interests will tell their stories. The folks of Herrin are tired of suffering in silence. They want to know just exactly why it is that coal from non-union western Kentucky moves right through their territory bound for market, while their own mines are cold and their men are doing nothing or worse. What they can or will do after they find out, nobody knows. But such a mass meeting never was held before, down there. The very fact of its being called is important.

It is to be hoped, however, that the Herrin men this time keep strictly within the law and refrain, certainly from murder, and even from intimidation. News that they are automobiling into the disorderly territory in Kentucky with automobiles bearing that name of evil connotation "Herrin" would be disturbing were the political control of Kentucky in the hands of men as irresponsible as those in Illinois at the time of the Herrin massacre.

Then, too, here comes the Illinois Commerce Commission. It notes that the Interstate Commerce Commission has raised the freight rates on Illinois coal going into the rich Northwest coal market twenty-eight cents and it formally resolves that this "seriously increases the present depressed condition of the mining industry in Illinois." Then it requests the state attorney general to "take such action, either by injunction or otherwise, as in his judgment may be necessary to adequately protect the interests of the people of Illinois." The new Northwest rates are scheduled for effect September 10 but the sovereign state of Illinois may yet block them, since its commerce commission is taking the field along with nearly a score of lesser organizations.

It is hard to foresee what all this hulabaloo in the interest of coal will do. It certainly ought to help a good many rank and file union miners to realize that with the costs of Illinois coal and of non-union coal where they are, Illinois is pretty sure to go hungry. But the interesting feature of the whole new movement is that an entire state is realizing that the coal industry is not necessarily a thing beyond the gates to be

constantly reviled and spat upon. The state confronts a puzzling situation. The question of the day is: "What to do?"

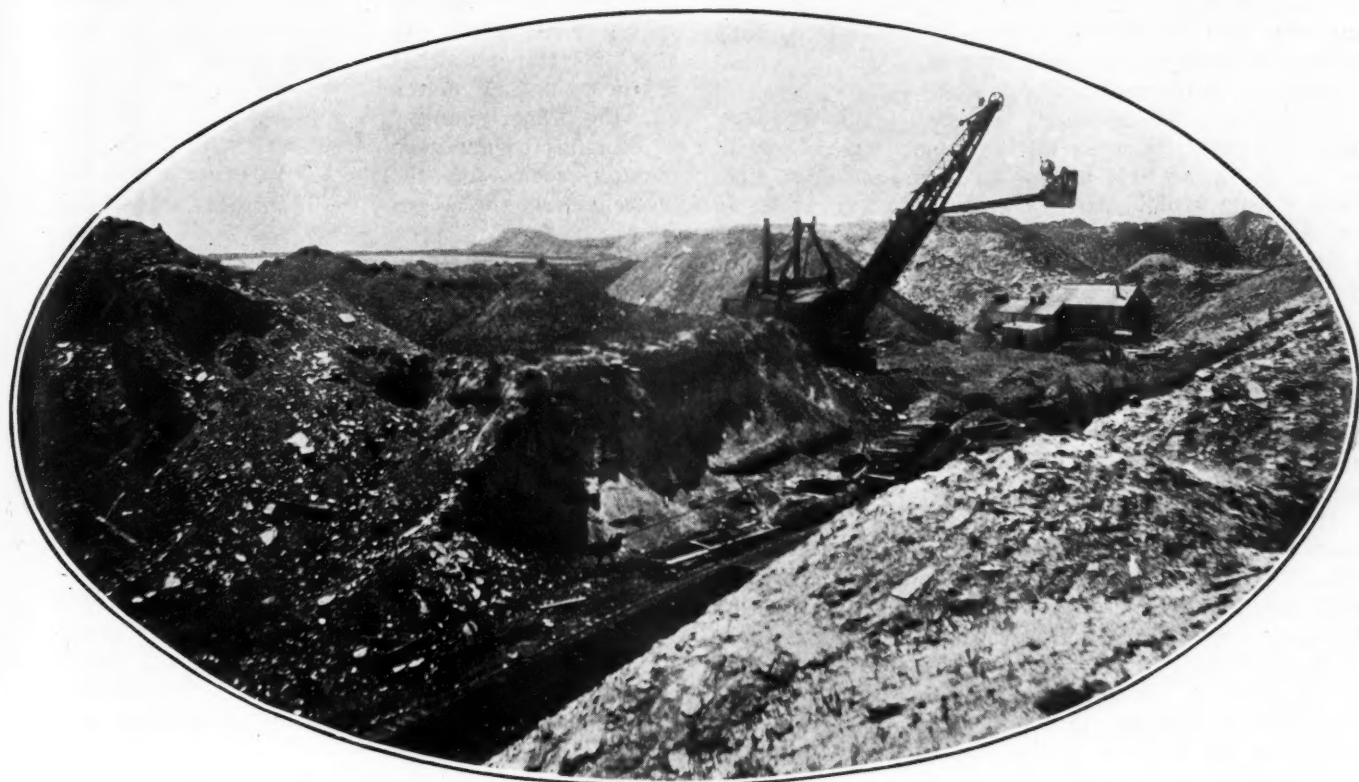
Our British Exemplars

GEORGE OTIS SMITH gives us in this issue the high lights of the program of the Liberal party in Great Britain in regard to coal. There are many who believe and still more who fear that we are likely to use the British as our exemplars. We got our union and our pit committee from them. We have followed a long line of their precedents in regard to labor. Let us hope that we shall not get from them that mitigated Bolshevism that the report contains, for in some ways the Sovietism that is unadulterated is better than a Sovietism that is hung around the neck of capital. It is planned in the report that the operators and their employees shall be co-equal directors of industry. The first will be subject to loss of capital and the other subject to nothing, not even worry, for if the enterprise fails they loosen their hold on it and attach their boring tools to another and sink that. The report says that back of every successful co-operative action must be self interest. What interest can there be between those who have all and those who have nothing to lose? But let us take courage. This manifesto on "Coal and Power" has after all only the approval of the Liberal party of Great Britain and we may be able to avoid it despite the readiness with which we take British precedents as our exemplars.

As for its references to the acquirement of coal lands and the leasing to concessionaires, less objection might be taken. Royalties are too high; they might at least be prevented from going higher. Requirements that the concessionaires spend enough to make mines safe, healthful and fit working places do not seem so outrageous. The illustrations we hope to show of the Campine will bear out the advantages of the concession system.

Then there is a further hope. The citizen consumer with his Pecksniffian manner, who has been so disposed to be critical and to wonder why the mine worker was not domiciled in tiled houses with pebble dashed fronts, half-timbered gables and exterior chimneys of the best type, will be given the opportunity to pay in the price of his coal his part toward such a consummation. He will no longer be able to berate. What he demands will be done, and he will pay for it.

We publish E. J. Mehren's reactions on the British situation. He says the British are "complacent." The report Dr. Smith has briefed would suggest that some men in Great Britain are neither complacent nor conservative but have a definite program for dealing with the situation. Alas that it is *such* a program as it is! Nor can we feel moved with admiration and assurance at the British qualities, for a country is as good as its whole people. No one can denationalize the undesirable. The fact is, as Mr. Mehren well says, that only too many in Great Britain are looking to the government and not to frugality and hard work. That statement may not affect all classes, but if it affects a large proportion it is certainly not safe for us to praise the British spirit. Unfortunately, not a few have been disposed to believe in America that our own individualism has of late years lost its sturdy qualities. We, also, desire in a measure a government that will act as lackey to our laziness.



Strip Mines Full of Pitfalls for the Unwary

Operators Can Easily "Landlock" Shovels Merely by Taking Out All the Coal in the Thoroughcut—Any One of Several Systems Will Prevent Loss of Coal and Useless Yardage

By GRANT HOLMES
Danville, Ill.

HOW simple a thing is coal stripping—to the uninitiated! The apparent ease with which shallow coal is sometimes uncovered and loaded has baited many a good man into ruin. Therefore, in a time like this, when so many people are going into stripping, including deep-mine operators hard-worn by the gruelling effort to reduce their costs, perhaps it will be helpful to scan the progress of stripping practice and point out some of the pitfalls of the business.

The man making his first venture into stripping ought to be warned against taking all the coal out of his first opening or thoroughcut. A wide bench of coal left in is the one thing that will keep his shovel from getting itself "landlocked" and helpless. He should know how to pile waste banks to protect his boundaries. He should realize the necessity of good tile drainage and of having sufficient pump capacity. He should know the virtues of the several methods of circular and parallel cutting so that he may not lose blocks of his own coal or spend money for unnecessary handling of overburden. Some of these things will be suggested in these pages.

In order to compete with the underground mines, the stripping operator must be able to produce a steady output as cheaply as possible. This fact has placed

stripping on a systematic and commercial basis never before attained. To acquire such conditions, gradual and cautious operations are recommended; the operator cannot expect to make big profits as soon as he commences stripping. The relation between stripping and loading must always be taken into consideration.

ROBBING THE COAL FACE IS DISASTROUS

Naturally, the fact that without stripping of cover, there can be no coal taken from a strip pit is self evident, but that too much mining will stop the stripping, is not quite as apparent, especially to new operators. The practice of too much mining, more commonly known as "robbing the face," means taking all of the coal out of a cut. When the steam shovel has completed the first or thorough cut, the inexperienced operator proceeds to mine out all coal exposed, at a handsome profit. Each succeeding cut is similarly "robbed." Finally, the steam shovel is stopped by being squeezed between the waste banks and the stripping face, unable to dig any farther.

Each cut has been a virtual thoroughcut, due to "robbing" of the coal. Hence, the shovel has been forced to make immense banks of waste material which occupies at least 25 per cent more space than it filled when in place. Each cut sees the space for waste banks become smaller, without decrease in the cutting until at last the equipment is locked tight, all due to "robbing the face" or neglect of the relation between

NOTE—Headpiece shows a stripping where lack of system has made the entire recovery of the coal difficult if not impossible. Though the surface of the land may be worth nothing, the coal lost by ill-considered stripping reduces appreciably the profit of the undertaking.

stripping and loading. In spite of all advice from old operators and the shovel builders, it seems that many of the beginners must at least try what seems to be most profitable—"robbing the face."

To prevent "landlocking" the shovel, the operator must not expect to make all the money on his coal at once. He should first have a stripping shovel of sufficient size to handle easily the deepest overburden in the field. After making a thoroughcut of maximum width, a strip of coal not over 30 ft. wide may be removed along the edge near the property or crop line leaving from 45 to 60 ft. of coal for a working berm. The shovel then returns making a cut a little less than 30 ft. wide. By maintaining approximately these stripping and mining widths throughout the time of operation, the stripping machine is able to work with ease and speed, placing the waste far enough away to prevent burial of the coal face.

If heavier overburden is reached, the cutting can be narrowed down, as the shovel is operating with the edge of the frame nearest the cutting, in a straight line with the outside edge of the stripping face, thus giving plenty of room for swinging the machine. If a bench or berm of coal is left on which the shovel can stand the success of the enterprise is assured, whereas if this berm is removed, failure is inevitable. The berm should be 45 ft. wide if the coal is strong or 60 ft. if it tends to cave at the edge.

IN HAND LOADING LEAVE EIGHT FEET FOR TRACK

Up to 1912 the coal was loaded by hand in all fields, and it is so loaded in some regions especially where bottom is uneven. Fig. 4 shows the most efficient method of hand loading. The stripping shovel operates as near the coal face as possible, enabling the overburden to be dumped far enough away to leave about 8 ft. of space between the face of the coal and the base of the wastebank. The track is laid for the length of the cut in this space. Short spur tracks or sidings are led off the main line to the coal face for loading, thus doing away with track entry cutting which is a heavy expense.

The locomotive engineer places about a dozen empty mine cars on one of these spurs. The coal diggers proceed to load the cars, while on the other spur another dozen of "empties" are being placed. When the first dozen are filled, the miners walk over to the second spur and load the cars there. Meantime, the loads are hauled to the tippie, and more empties placed on the recently vacated siding. This alternate loading on each spur makes a continual flow of coal to the tippie and keeps all hands busy.

As the coal face recedes, the sidings are thrown over

accordingly within shoveling distance. By this time, the shovel has reached the end of the cut; the proper quantity of coal has been mined, making room for the wastebank on the return cut.

In some fields where the coal seam is very irregular, containing many "dips," other methods of loading are adopted. Instead of going to the great expense of maintaining a haulage track on such a bottom, the haulage road is placed on top of the bank near the stripping face. The coal is loaded into boxes or "skips." A locomotive crane operating from "on top" transfers the loaded skips from the pit to flat cars on the haulage track.

On arrival at the tippie, a derrick hoists the boxes up to the receiving hopper. The bottoms of these skips are hinged, enabling the coal to be dumped easily. The biggest disadvantage of this system is the maintenance of two extra machines, the crane and the derrick, besides a locomotive and track. The fact that each skip must be handled six times in one round trip to the tippie, is also against this method.

In 1912 the T. J. Forschner Coal Co. of Linton, Ind., installed a small revolving shovel at its strip mine to load coal. So successful was this machine that now every strip pit where conditions permit, has its coal-loading shovel. These small machines have usually a 26-ft. boom and a specially designed 14-yd. dipper. Being mounted on traction wheels, no tracks are necessary. An engineer and fireman operate the machine, if it is operated by steam, easily loading 1,000 tons of coal in eight hours.

TWO LOCOMOTIVES SHUTTLE CONTINUALLY

Two small locomotives are required to handle the coal without loss of time, for while one is spotting a train of cars for the shovel, the other is hauling loads to the tippie and returning with empties. Either 5- or 15-ton mine cars should be used for steam-shovel loading, those for hand loading holding about three tons.

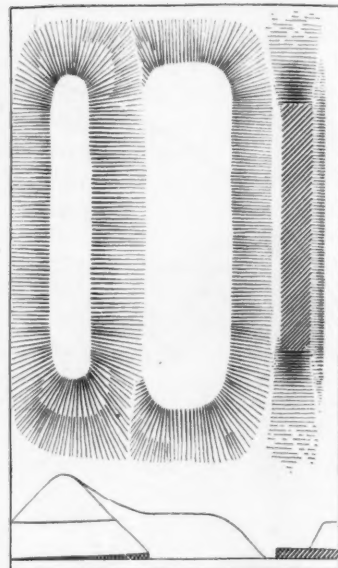


Fig. 1—Stripping by Team and Scraper

Preferable way of handling the stripping of coal with this primitive form of equipment.

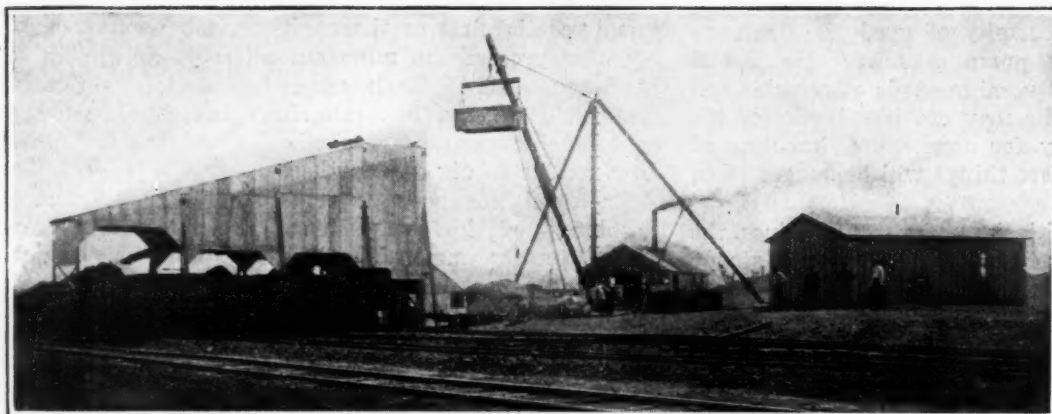


FIG. 2
Hoisting Boxes to Tippie

Scene at Fuller, Kans. Derrick is hoisting 4-ton skip. Plan of handling coal eliminates some construction and haulage problems but is too slow and expensive wherever conditions do not require its adoption.

The track for either hand or mechanical loading should be built of 40- to 50-lb. rails laid on wooden or steel ties without ballast, as the track must be laid anew for every new cut. In some mines where only run-of-mine is sold, railroad gondolas are run directly into the pit and loaded, standard gage track being necessarily used in such cases.

Years ago much prejudice had to be overcome before the machine loading of coal was accepted as practical. The objection was the excessive breaking of coal, but experience shows that only 18 to 20 per cent of slack, results from steam-shovel loading. One seeming disadvantage is the loading of impurities with the coal, but the installation of picking tables on the tipples has largely solved this difficulty.

The track arrangement in the pit for machine loading is different from a hand-loading layout. Figs. 6 and 7 illustrate two possibilities for mechanical coal loading with their accompanying track systems. The stripping shovel must be moved over from the breast until sufficient space is left for haulageway. This brings the base of the waste bank within five feet of the coal face, accommodation for drainage tiles being necessary. The swath of the coal dug out by the shovel is not over 30 ft. wide, depending upon the depth of the overburden and the capacity of the stripper.

In Fig. 6, a common, but not especially desirable condition of operation is shown. The coal shovel is following the big shovel thus depending upon it for each day's output of coal. If the stripping machine should break down, no coal could be produced until repairs were made. Fig. 7 shows a more advantageous situation in which the coal output is not entirely dependent upon the steady work of the big shovel. If the stripping shovel should break down, coal may be loaded until the end of the cut is reached, and by this plan the continuance of stripping depends upon the loading to provide room for a wastebank. The cuts if long enough will provide a steady output while repairs to the big shovel, however extensive, can be made.

While the coal loading was being developed to its present state of perfection, the stripping part of the business kept pace, the important factors in the operation of the large shovels being ascertained. It was

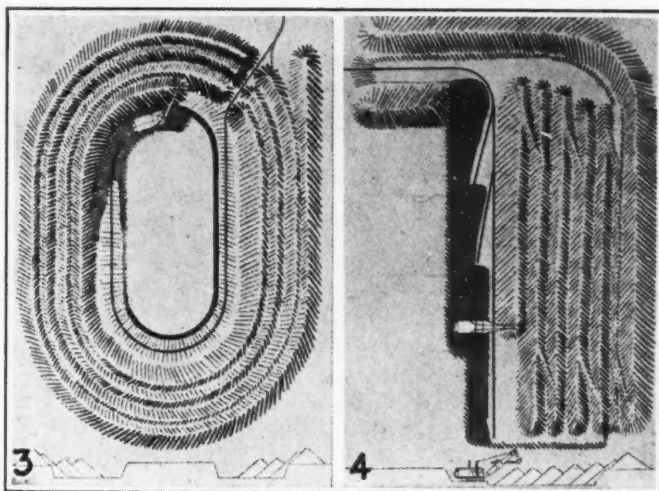


Fig. 3—Circular Plan of Stripping

With this plan, much trackage must be maintained, but this scheme keeps it to a minimum. An entrance is kept open by piling spoil on each side of the entry cut.

Fig. 4—Economical Way of Hand Loading

Stripping shovel operates as near coal face as possible and dumps overburden so as to leave 8-ft. clearance in front of coal face. Spurs make entry cutting unnecessary.

necessary to learn not only how the shovel should be handled but also where the material should be placed.

Of primary importance in the development of steam shoveling has been the creation of a new type of engineers and cranemen to operate these stripping shovels. They differ from the "old timers" by placing the careful handling of the machine above its yardage. The immense size and great weight of the mechanism has made this necessary, especially as 90-ft. booms and 5- to 8-yd. dippers on shovels weighing 300 tons now are not uncommon.

To keep ahead in the stripping work, two shifts of men are required to accomplish what was formerly done in one shift to the great detriment of the shovel. Consistent, steady running has been found the key to successful operation.

The shovel crew consists of four men. The engineer, who controls the hoisting and lowering of the dipper and the swinging of the machine, is the boss; he receives the highest wages, and his judgment and



FIG. 5

Three-Hundred Ton Electric Shovel

Eight-yard dippers and 90-ft. booms make the production of strip coal possible even where overburden is tremendously heavy. The length of boom and size of dipper may be increased in order to make deeper stripping possible, but the conveyor in one form or another may step in to meet this necessity, though the variety of the materials handled and of its condition make the use of the conveyor difficult.

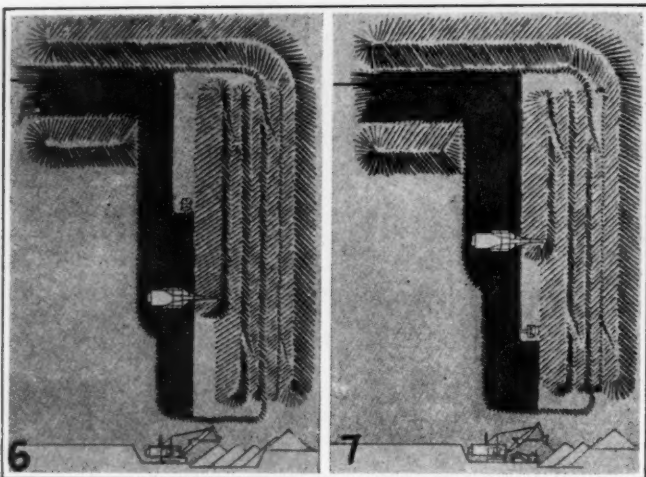


Fig. 6—Common but Undesirable Plan

Here the loading shovel depends for each day's loading upon the stripping shovel. If stripper is delayed loading has to stop. Note that coal is loaded on cars running on track on top of coal.

Fig. 7—Loader Can Work If Stripper Is Idle

More advantageous arrangement than in Fig. 6, but big shovel must depend on loader to make room for waste banks. If cut is long enough loader can work even if stripper is off for extensive repairs.

mechanical knowledge should make him worthy of them, for on him depends the welfare of the entire shovel. The other men have a tendency in their work to follow his example, careless or otherwise.

The craneman who crowds or "eases" the dipper in digging and dumps it, is the right-hand aid of the engineer. Upon their team work, depends the work accomplished by the machine, therefore, they should be as agreeable in personality as possible, each performing his duties in perfect conjunction with the other.

If a steam shovel is used the third man is the fireman. He devotes his entire time to stoking the boilers and maintaining the water supply; his skill and intelligence can prevent many shutdowns from leaking flues. He also should be able to make other boiler repairs.

The fourth member is the oiler who keeps open ears and eyes for squeaks, unusual noises, leaky joints, or dry bearings. Too often managers consider this man

an unnecessary expense. This is a great mistake, for his value is inestimable, in view of the repairs and time losses he can prevent. The oilman takes care of the multitude of oil cups and lubricators, and he has also to watch many minor details of operation. In this way he saves the other members of the crew from being distracted from their work.

Four times each day the entire crew of the well-operated shovel joins in a general cleaning, inspection and oiling. The engineer attends to the hoisting and swinging engines, the craneman to all the boom machinery, the fireman cleans the fires if necessary and examines the water pumps, and the oiler sees that the swinging parts and running gears are supplied with lubricant.

Four other attendants to the shovels are known as "sod-hogs." Their duties are to grade and lay track and to clean up the dirt missed by the dipper.

FLOODS KEEP STRIPPING FIRMS BUSY

Some fields are so situated as to be entirely free from floods or an abundance of springs. Many stripping properties opened recently are on high ground but there are many in bottom land where drainage is the principal problem. Much strip coal land seems to be diabolically situated near some river capable of overflowing its banks at the slightest provocation. The usual association of streams and strip coal is due to the fact that the river has at some time previous washed the deep soil from the coal, leaving it suitable for strip mining. Hence, drainage becomes an important but often neglected feature of planning stripping plants.

Of course, the operator cannot tell with much certainty what his water problem will be until the work is progressing, but equipment for any emergency should be on hand. Above all other equipment, electric power should be available, and if central station current cannot be had, no better start for a strip mine can be recommended than the erection of its own power plant.

Several small pumping units and perhaps one large unit are necessary. Each unit consists of a motor and direct-connected centrifugal pump mounted on a truck. Discharge pipes made of spirally wound, galvanized

**FIG. 8
Stripping Takes to Hills**

Dump house, incline, monitors, approach trestle, tipple and supply track at mine of Beech Flats Coal Co., Rush Run, Ohio. Hilltop stripping has its advantages in the matter of drainage, for the strip pit is not likely to be inundated by the river, but it often complicates haulage to the tipple. Tipples for handling strip coal are as complete as those for deep-coal preparation.



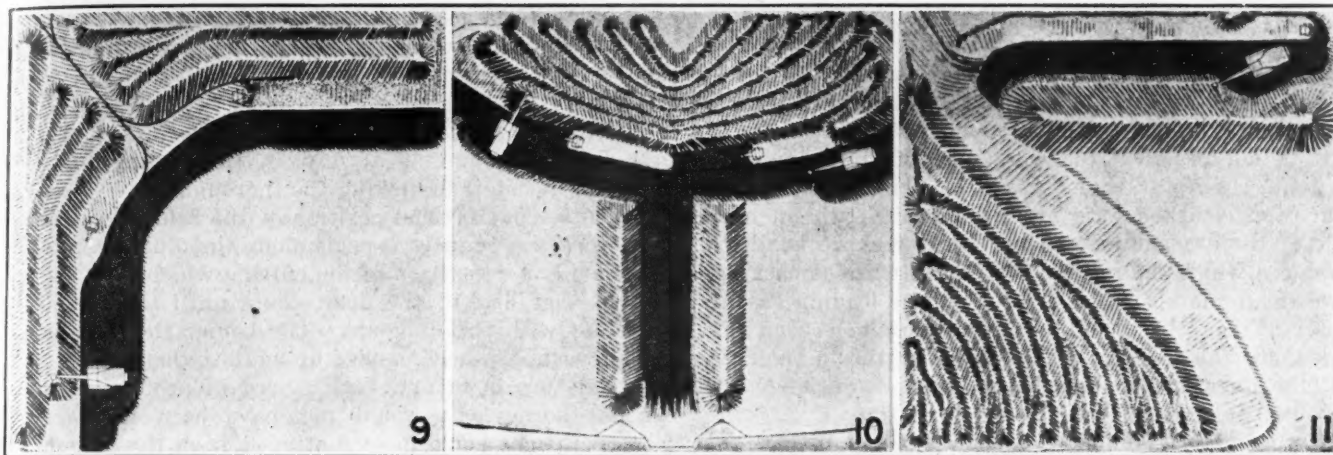


Fig. 9—Rectangular or Two-Pit Method of Stripping

Incidentally this method gives opportunity to protect the edge of the pit against caving, in case it is close to boundary of property. On the thoroughcut, the big shovel deposits waste away from the boundary. Returning to the corner from which it started, it dumps its second cut and about half the waste of the first cut against the boundary. Thus law suits may be avoided.

Fig. 10—Stripping Valley with Two Sets of Equipment

Where the cover is thin in the middle of the property and thick at the sides, the two big shovels first cut down through the middle and then work away from one another. The work constantly retreats toward the tipple as in retreat system of mining, thus steadily shortening haulage with consequent savings. The cutting line is almost straight for both strip shovels.

Fig. 11—If Right-Angle Method Is Unsuitable Try Radial Plan

Where property lines must be preserved, this scheme protects them without leaving a wide strip of coal. Spoil from the thoroughcut along one boundary is piled inside. From the end of this pit the shovel makes alternate short and long cuts, working at an angle of 45 deg. to the property line and dumping back toward it. This fills the stripping face made by the thoroughcut.

iron, connected without the use of unions, are cheap and easily handled.

One of these small units is kept with the coal-loading shovel, which at a short distance behind itself, digs up a small dam between the waste bank and the coal face. The discharge of the pumps is behind this dam, thus keeping the coal pit free from water. If much water comes into the haulage way, a sump is dug at the lowest point, and a large unit installed there permanently, with discharge laid over the wastebank.

WET OVERBURDEN AND WASTE WILL SLIDE

Where seepage and springs pour great quantities of water into the cuts, a system of tiling should be laid, if possible. A large main parallel to the cutting is placed in the first cut, below the coal, and openings in this line carry away the water in the first pit. Laterals are attached to this main, laid under the wastebanks as each succeeding cut is made. The openings are located between the foot of the spoil banks and the face of the coal.

Floods are not all the troubles arising from water. The wetness of the overburden is another phase of the drainage problem. If very wet and sloppy, the waste banks will slide down suddenly and unexpectedly, sometimes burying the coal-loading machine or, at least, covering up the coal face. The face of the cutting will also slide down from the undermining effect of springs, perhaps catching the stripping shovel.

Here is where a bed of shale or soapstone above the coal is an advantage, for by leaving in a bench of this material along the stripping face, many slides will be prevented. If that shale or soapstone which must be dug is deposited near the coal face in a small, separate wastebank, and the wet, slippery material dumped behind it, a double-built and double-strength bank results. The burial of the coal face is avoided, as the bank of hard material is a retaining wall for the overburden which would slide down.

Throughout the history of stripping, one of two systems of operation, circular or parallel, has been used with each style of machine, according to its adaptability. The circular system has been proven im-

practical in irregular fields, and wasteful and costly in any field. Therefore, with the building of the modern stripping shovel, parallel cutting came into general use. No one definite method of applying this cutting can be recommended as each field has its own peculiar problems in shape, drainage and depth of overburden. By means of sketches, some of the plans coming to my notice are shown with this article. They will suggest "how to do it" to new operators who may read this.

Figs. 4, 6 and 7 illustrate the methods probably most commonly used and the one applicable to many fields. The thoroughcut is made in the shape of a right angle following the property lines the width and length of the land. The overburden is piled on both sides of this cut. The shovel now uncovers the coal by cuts parallel to the field length, starting with the long part of the initial cut. A haulageway is maintained in the shorter part of the thoroughcut. In hand loading, the coal is mined out of the haulageway, whereas in machine loading it is left in.

TAKING OUT BOTH COAL AND FIRECLAY

In some strip mines, the coal bed is immediately above some other valuable material, such as fireclay for brick making. A two-pit arrangement would be desirable in such a case, for loading out both materials.

Fig. 9 illustrates a field opened on a right angle, incorporating the shortest haulageway possible. The sketch also shows another method of handling the thorough cutting to be used when the work is near a property line.

The shovel has started from a corner of a field making the first cut along one side, depositing all waste away from the property boundary. Returning to the corner, the shovel dumps its cutting and about one-half of the thoroughcut wastebank against its boundary. Caving in along this line which might result in heavy lawsuits against the mine owners, is prevented by throwing the overburden in this manner.

Starting from the same corner at right angles to the first cut, the second thoroughcut is made. As the dumping is done mostly at right angles to the digging in the operation of the stripping shovel, a gap has been

left in the spoil banks when the 90-deg. turn is made. This gap will occur the diagonal length of the field, leaving a naturally formed haulageway. If the feasibility of such a haulage gap is not clear, compare the space for wastebank with the spoil to be placed there.

It is not practical to switch one of these immense stripping shovels around a sharp corner. Therefore, four wedge-shaped cuts are next made—two on each side of the haulageway. Thus an easy curve has been produced which the machine can make without backing. Two small shovels are put at work, one loading coal in one pit, the other loading fireclay in the second pit. Track for the coal end of the mine is laid on the coal, but the line for the clay shovel is put down along the base of the adjacent wastebank.

If the material under the coal is not valuable, but a large output of coal is desired, two stripping machines and two coal-loading shovels may be installed by using this 90-deg. field plan, one set operating in each pit. The wedge cuts shown in the sketch would not be necessary in that instance, as neither shovel would have to

Starting from a corner, a thoroughcut is made along one boundary throwing the overburden toward the inside of the property. From the end of this pit, the shovel makes alternate short and long cuts. The object is to keep the machine working at 45 deg. to the property line and dumping toward it, thus filling in the stripping face left in making the thoroughcut.

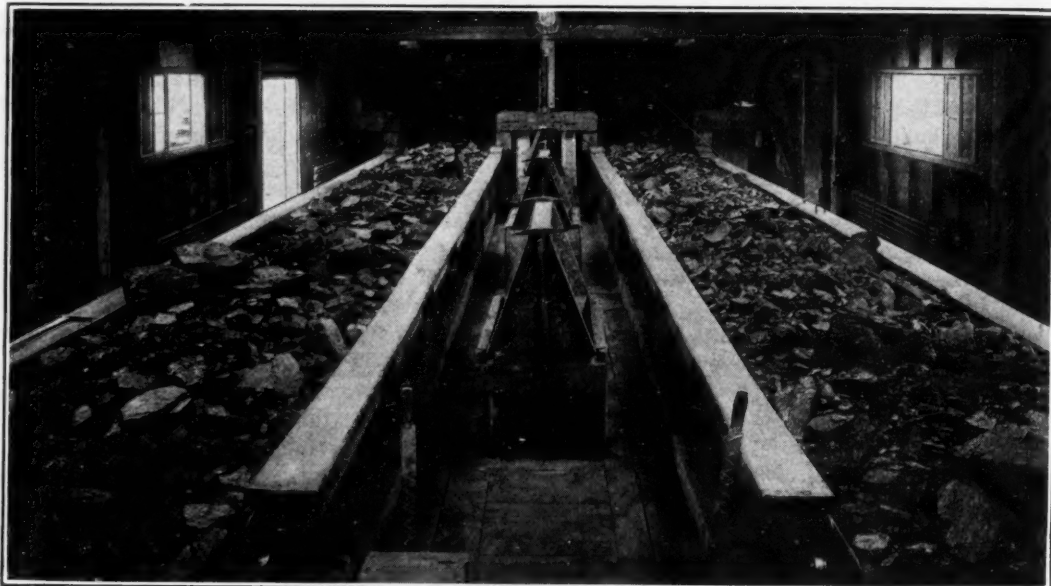
When a true diagonal position of the field is reached, the second thoroughcut is made along the other property boundary. A repetition of the cutting which took place in the other half of the field occurs until the last cut coincides with the diagonal. The boundaries are safe as the waste has been banked up against them.

If only one boundary was in need of protection, the second thoroughcut would not have been necessary. The operations could have continued from the diagonal by making alternate long and short cuts until the opposite edge was reached.

Many other arrangements or combinations of these systems will suggest themselves as improvements on those described, but some such plan must be used for

FIG. 12
Picking Table
for Strip Pit

Picking tables of this order are commonly used so that the bogey of dirty coal may be lifted from the name of stripping. Nowadays, some of the most elaborate cleaning and sizing plants are located at the big strip pits. In earlier days coal was sometimes loaded by railroad shovels into gondolas and went to market uncleaned. This gave strip coal a bad name.



make the turn. Each would work up to the corner and then return.

Fig. 10 gives another plan for operating two sets of machines in a field which has light overburden through the center, but heavy at the edges—that is a field in a valley. The thoroughcut is made through the middle for the entire length of the property. At the end of this cut, the shovels diverge. By thin cutting near the haulageway and heavy cutting at the crop or property line, field conditions gradually become such that the two pits are in a straight line.

As with the 90-deg. system, each set of machines works up to the haulage and returns. The operations are constantly nearing the tippie, thus decreasing the length of the haulage, as is the case with the retreating system of underground mining.

HOW TO AVOID CAVING AND SPOILAGE SUITS

Let us suppose that two sides of a field are property lines which must be respected, that is, they must be left in such condition that when the stripping is completed that they will not cave in. Fig. 11 gives a method of protecting the boundary without losing a big strip of coal, if for any reason the right angle plan is impracticable in the field being operated.

successful strip mining. Haphazard stripping always results in blocks of coal left here and there in the field, useless handling of overburden and shut-downs. But with a good coal bed, a system and regard for the relations of stripping and mining, the modern stripping shovel will accomplish all that can be desired in overburden from nothing to 40 ft. deep.

The near future will undoubtedly see a machine with a dipper capacity of 12 cu.yd. and of sufficient size to achieve the same results as the shovel just mentioned but with a cover 60 ft. deep.

MUD-SLINGING TANK bespreads mine with rock dust—On the truck of a coal-mine car, W. J. Reid, Superintendent of the Lion Coal Co., at Wattis, Utah, has mounted equipment for spraying the roof, ribs and floor of the mine with a mixture of rock dust and water which adheres to everything it touches like whitewash. With one passage of this machine proceeding at about 1,500 ft. per hour a thick coating of mud is distributed which covers the entire periphery of the heading. This mud dried by the air passing through the mine turns to a fine dust. The rock dust used by Mr. Reid in his demonstration in Mine No. 1 is made from a shale which forms part of the hills in which the mine is driven.

Concentrating Tables—Their Operation and What Results They Obtain in Cleaning Anthracite

Used First Eight Years Ago — Clean Sizes up to Pea — "Tabled Coal" Demanded in Some Markets—Clinkering Eliminated—Less Ash After Burning—Reduced Labor — Increased Boiler Capacity — Regulatable Ash Content

BY JOHN GRIFFIN*
Wilkes-Barre, Pa.

AS HAS BEEN stated previously in this periodical, the art of coal preparation today is in a state of flux, changes and improvements taking place with almost bewildering rapidity. Taking a leaf from the notebook of the metal-mining industry, some anthracite operators years ago experimented with concentrating tables for cleaning the smaller sizes of anthracite. In this case, however, what corresponds to the gangue of the metal mine in its low specific gravity, is the cleaned product of the coal mine, whereas the concentrate of the metal mine is analogous in its high specific gravity to the worthless rock, slate and refuse extracted from the coal.

Concentrating tables have now been in commercial operation on the smaller sizes of anthracite for about four years. Their product, meanwhile, has proven so satisfactory to consumers that in certain markets a definite demand has been created for what is called "tabled coal."

About eight years ago the first concentrating table was tried on buckwheat No. 4 anthracite. The machine tested was a standard table as used for ore concentration. The trials, however, indicated its practicability and also that better results might be secured by redesigning the machine, giving it a larger deck, better suited to meet the conditions encountered in coal cleaning.

In the spring of 1920, after much experimentation at the testing plant of the Deister Concentrator Co., Fort Wayne, Ind., the first Deister-Overstrom diagonal-deck table designed for coal washing was installed in the Wadesville breaker of the Philadelphia & Reading Coal & Iron Co. This machine was put to work treat-

ing barley, or buckwheat No. 3 coal. About the same time the Hudson Coal Co. installed a duplicate of this table in its Loree breaker for experimental work in cleaning No. 4 buckwheat.

EXPERIMENTS PROVE UTILITY OF TABLING

The success attained with these admittedly more or less experimental installations led to the adoption of the table at many breakers throughout the anthracite region. It is estimated that over three hundred machines of this kind are now in use and that about 6,000,000 tons of coal are treated by them annually. Not only are these machines employed on the buckwheats Nos. 1, 2, 3 and 4, but tests on pea coal have shown highly interesting results.

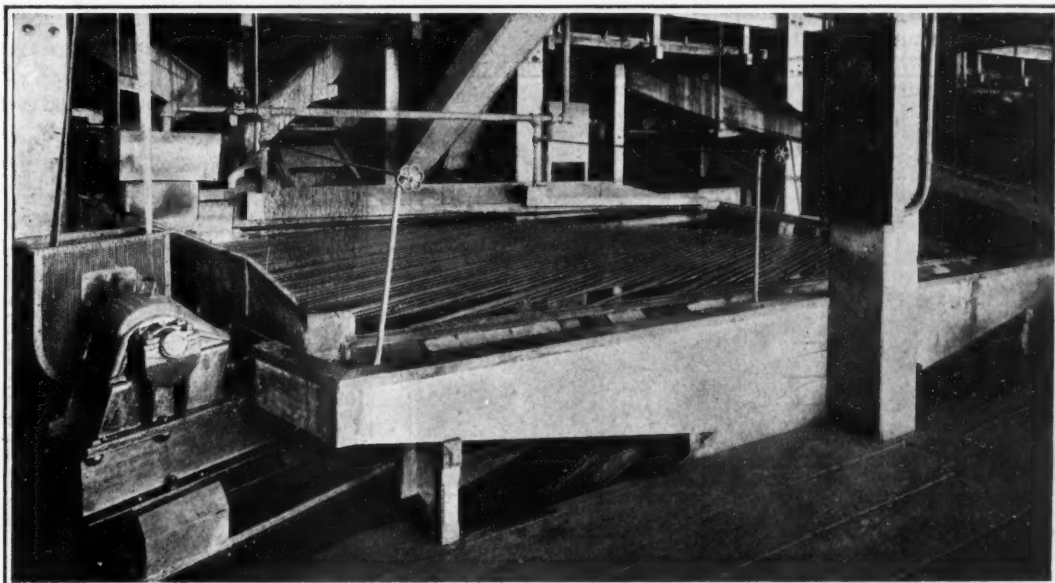
Many of the early tables were installed for the purpose of cleaning coal for use in the mine boiler plant. In many cases the use of tables has reduced by half the quantity of ashes and refuse taken from the boiler ashpits and has entirely eliminated clinkering. Furthermore, in addition to enabling the boiler plant to operate at a higher capacity, table-washed fuel has in many cases reduced boiler-room labor between 25 and 35 per cent.

Again, in not a few instances, satisfactory boiler operation has been obtained from table-washed barley, whereas prior to its use a generous admixture of rice or even buckwheat No. 1 was necessary in order to carry the load. The weight of fuel consumed in such cases has not been increased. Results obtained in their own boiler plants convinced the coal companies that the use of tables would permit them to offer the public a superior fuel in the shape of table-washed steam sizes.

*Manager, Anthracite Territory, The Dorr Co.

FIG. 1
Cleaning Buck-
wheat No. 1

The riffles on the platen of this machine appear to be set diagonally. As a matter of fact, the table does not have a rectangular but a parallelogrammatical outline, and the riffles extend in the direction of oscillation. Greater capacity from a given area is thus obtained.



Like the jig, the concentrator table utilizes the difference in specific gravity between coal and slate in obtaining a separation of these substances. The preparation is, of course, wet and takes place on a deck, platen or table inclined both longitudinally and transversely. The transverse inclination, however, is far greater than the longitudinal. This deck is covered with strips or riffles extending throughout its length and is reciprocated approximately 265 times per minute, the amplitude of each stroke being about $\frac{3}{4}$ in.

The material to be treated, with about twice its weight of water, is fed to the table at its highest corner. Water-distributing boards along the upper edge of the deck keep a sheet of water flowing across it. Under the action of this water and the reciprocation of the table, the various particles stratify in accordance with their respective specific gravities. Thus the heavy uncombined ash-forming substances, such as pyrite, sand, rock, slate and the like, seek the surface of the table between the riffles, by which they are guided to its end where they are discharged. The coal on the other hand, being lighter, is washed across the riffles and into the clean-coal launder or chute.

The above is a general description of the action of any concentrator table. Specifically the Deister-Overstrom coal-washing machine is built with a "diagonal deck." This affords a table, the boundaries of which closely coincide with the well-defined lines of separation between coal and refuse. More efficient washing is thus obtained from a given deck area.

DISTINCT SEPARATION FORMS BALD SPOT

The distinct separation between coal and refuse is evidenced by a "bald spot" at the juncture or corner of the coal side and refuse end. Thus all coal is washed

TABLE I—Capacities of Concentrating Table in Relation to Size Treated

Size	Tons of Feed per Hour per Table
Buckwheat No. 1.....	15 to 20
Buckwheat No. 2, or rice.....	12 to 18
Buckwheat No. 3, or barley.....	6 to 14
Buckwheat No. 4.....	4 to 6
Slush.....	2 to 5

off the deck before reaching the end of the table, and the refuse is discharged well away from the coal side. This assures complete separation into a refuse-free coal and a coal-free refuse, without the production of any middlings product requiring retreatment or separate disposal.

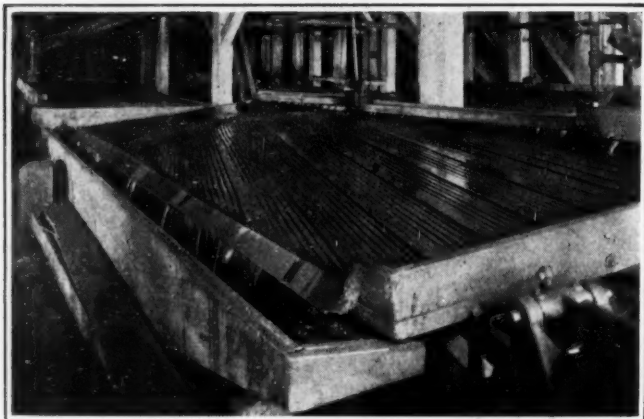


Fig. 2—Rice-Coal Tables in the Lehigh Field

In use, a concentrator table is inclined in two directions—a slight longitudinal inclination and a far more pronounced transverse slant. Adjustment of these slopes determines the quality of coal produced.

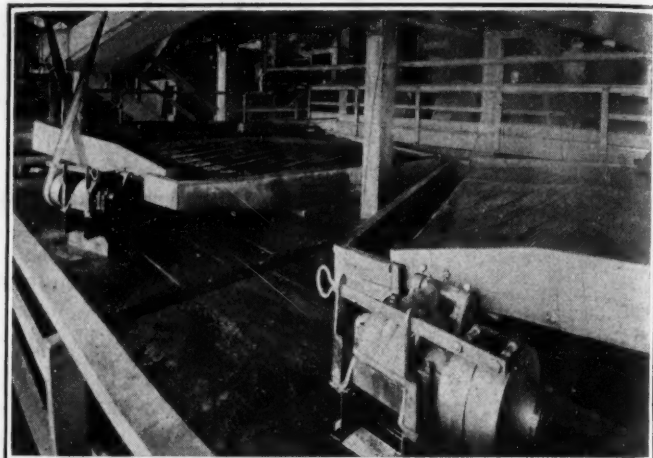


Fig. 3—Rice and Barley Tables

At present tables are used mostly in treating steam sizes. For this purpose they form part of the regular equipment of many a breaker or washery.

If for any reason it is desired to split the clean coal into two or more products, this may be done with ease. The coal discharged near the feed end of the table will be low in ash, and that leaving the platen nearer the refuse end will be higher in ash-forming material, as this heavy material crosses the riffles more slowly than the lighter coal.

SIZE OF MATERIAL TREATED INFLUENCES CAPACITY

The capacity of a coal-washing table varies somewhat, depending upon the size of coal treated, its character (as the difference in specific gravities of the materials to be separated affect the ease of their separation) and also the quality of clean coal desired.

In general, larger sizes of coal can be treated at higher capacities than the smaller sizes. Again, if coal extremely low in ash is desired from a table, the tonnage treated will be somewhat less than that handled under normal operation. The range of capacities given in Table I has been obtained when treating various sizes of anthracite.

The effect of the quality of clean coal obtained upon the capacity of a table is well illustrated by the results obtained on barley coal at a certain breaker near Scranton. When producing one carload of clean coal per day, that is, handling between 50 and 60 tons of feed, the ash in the tabled product was between 10 and 11 per cent. When, however, the output was increased to 85 tons per day, the ash ran 12 to 14 per cent.

Recent tests on buckwheat sizes Nos. 1, 2 and 3 at a breaker in the southern field and extending over three or four days' operation on each size, gave excellent results so far as tonnage handled, recovery of clean coal and quality of product were concerned. These results are given in Table II.

EXCELLENT RESULTS OBTAINED WITH FINE COAL

At this breaker, tests were also conducted on pea coal, five carloads being made in two days or in a total working time of 17 hr. This indicated a production of 13.2 tons of clean coal per hour from a feed of 20.2 tons. Analysis of samples of the raw feed showed that it contained 38.5 per cent of refuse, whereas the cleaned product had only 5.74 per cent. Analysis of the refuse discharge showed 2.02 per cent of coal in the reject. These results indicate a recovery of nearly 99 per cent of the coal in the feed, and a removal of 90 per cent of the refuse from the material tabled.

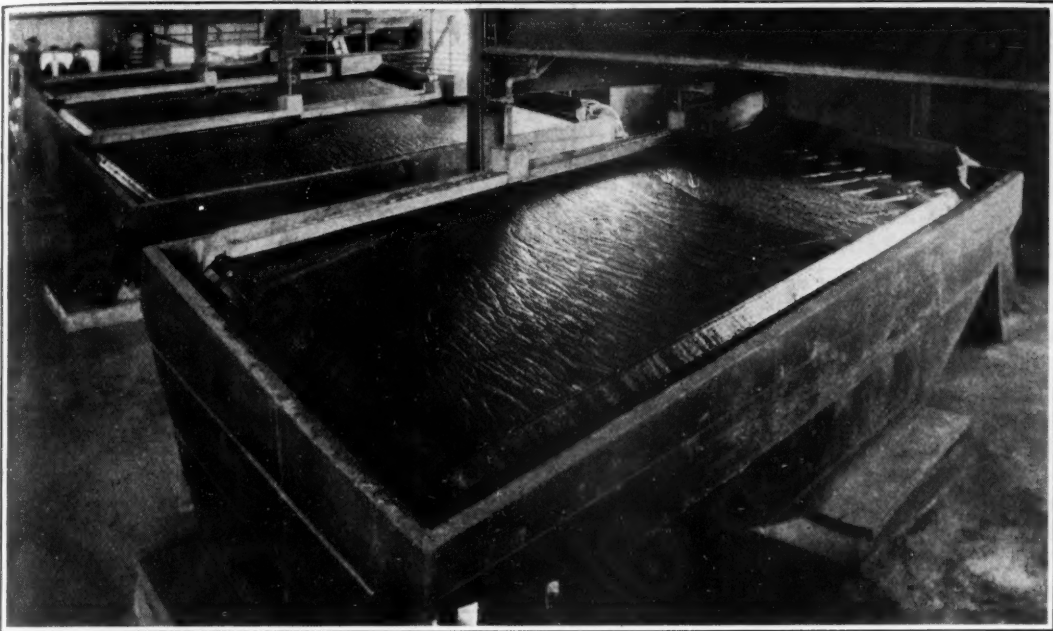


FIG. 4
Buckwheat No. 4
Tables

Four tables cleaning this small size of coal between $\frac{1}{8}$ in. and 65-mesh. In all there are eight tables used in this breaker for cleaning this extremely small coal. Table capacity decreases with a decrease in the size of coal treated. The quality of both coal and refuse may be varied with the setting of the table and the quantity of feed handled.

In the accompanying illustrations, Fig. 1 shows a coal table that cleans No. 1 buckwheat at a breaker in the Lehigh field. Fig. 2 shows four similar tables that clean rice. An 8-hr. test on three of the four tables of Fig. 2 showed a production of 373.7 tons of clean coal, analyzing 13.20 per cent ash. The feed to these tables contained 21.3 per cent ash, and the refuse product leaving them carried 73.9 per cent of ash. Each table averaged 18 tons of feed and 15.6 tons of clean coal per hour.

WASHES FINEST SIZES OF COMMERCIAL COAL

Fig. 3 shows two coal-washing tables, one for rice and one for barley, at a breaker in the Lehigh field. Fig. 4 shows four tables out of a total of eight installed in a breaker in the southern anthracite field and operating on buckwheat No. 4. This installation, when six tables are operating, produces 200 tons per day of buckwheat No. 4, analyzing 13 to 14 per cent of ash from a feed containing 25 to 30 per cent of ash.

At a certain breaker in the Wyoming field, a low-ash buckwheat No. 4 is being produced. This is coal that passes through a $\frac{3}{4}$ in. circular opening, but is retained

reduction in the ash content of the material treated, to handle large tonnages and produce a product of uniform quality from a raw feed of varying quality. When properly installed, they are easy to operate and low in operation costs. Thus, with the table it is possible to effect great reductions in the ash content of the material treated without undue loss of coal to the refuse and with a reasonable capacity. Furthermore, the table is highly flexible in its operation and permits of a fairly definite control in the quality of the coal produced; that is, at the will of the operator, the product may be made either medium or low ash as desired.

Shall Central Power Stations Leave Cities
And Be Re-Erected Near Mines?

The proposal to establish near pit heads a number of superpower stations for electric supply has fired the imagination of laymen and newspaper writers both here and in England, says the *Electrical World*. Even engineers who ought to know better have succumbed to the suggestion. There is no doubt of the savings in the generation of electricity made possible thereby; but the trouble is, and it is an insuperable one, that nature has rarely seen fit to put coal and water together. However, for every ton of coal burned under modern power-house boilers, from 600 to 1,000 tons of water are required to condense the steam discharged from the turbines. That is why superpower stations must in the main be built on large rivers or at tidewater, and that is why the great interior cities of this country and of England are handicapped in the erection of superpower steam stations. Coal is usually obtainable, water is not; and modern stations require a thousand times more water than coal. As a matter of fact, the Waterside station in New York City pumps more water for condensing purposes than the whole city of New York consumes for all purposes, and the same is true of the Commonwealth Edison Co. of Chicago and numerous other public utility companies possessing huge steam generating stations. A station at the coal mine is ideal, but, like many ideals, rarely works out when put in practice.

TABLE II—Tests on No. 1 Buckwheat, Rice and Barley Anthracite

	No. 1 Buckwheat	Rice	Barley
Breaker time, hours and minutes.....	33.27	25.30	23.30
Number of earloads produced.....	8 $\frac{1}{2}$	6 $\frac{1}{2}$	5 $\frac{1}{2}$
Clean coal produced, tons.....	371.55	307.50	243.90
Feed to table, tons per hour.....	19.27	17.95	14.43
Ash Analyses:			
Per cent ash in feed.....	43.30	35.75	33.53
Per cent ash in clean coal.....	15.45	15.03	17.46
Per cent ash in refuse.....	80.60	78.19	74.72

on a 200-mesh screen. After passing over the tables in this plant, the ash in the finished product ranges from 9 to 11 per cent. Because of the extremely small size of the material treated and the low ash in the product, the feed averages only about two tons per hour per table. The result of one month's operation showed that the feed to the tables averaged about 29 per cent of ash, while the average ash in the clean coal for the same period was 9.5 per cent.

Tables employed to clean the steam sizes of anthracite have demonstrated their ability to effect a great

A British Solution of Coal-Mining Problems

Would Have Nation Acquire Ownership of Coal Lands and Leave Operation in Hands of Concessionaries Subject to Leasing Agreements, Providing for Better Housing and for Royalties Based on Coal Values

BY GEORGE OTIS SMITH
Director, U. S. Geological Survey,
Washington, D. C.

"COAL AND POWER" is the title of a concise and readable report issued July 12 by a committee of the Liberal party under the leadership of D. Lloyd George. The linking of the reorganization of British coal mining with the larger program of the rejuvenation of British industry is doubly significant in a semi-official document appearing at the close of the World Power Conference in London. Mr. Lloyd George's committee concludes its proposals with an eloquent reference to the first industrial revolution that began one hundred and fifty years ago, when steam brought in its train evils as well as benefits—"a dirty and smoky civilization."

Now, we are entering the early stages of a second industrial revolution when electricity may be the means of repairing these evils, by giving us a clean civilization and by decentralizing industry thus rendering possible a healthier distribution of people over the face of the country. The Lloyd George report has met with criticism as a political paper, but the Liberal party has clearly sensed the great possibilities of a better utilization of Britain's coal resources, and has stated plainly the social ends to be attained—that much is above party and indeed may be common property of all nations.

The dissatisfaction with existing conditions which our British cousins feel is all set forth as the premise of this report, and it all has a familiar sound. The miners complain of inadequate and unequal wages, of housing conditions worse than those of other workers, of excessive royalties to land owners (a burden to the industry actually small but psychologically of considerable weight with the miners) and of non-participation in the control of the industry in which they invest labor and life.

The mine-owner is likewise dissatisfied; labor unrest and political action interfere with economic law; exactions of landowners make efficient operation still more difficult; and absenteeism and shortness of working hours prevent greater production. The consumer in turn objects to the price of coal, which has risen more than 100 per cent, whereas cost of living has increased 69 per cent, and miners' wages, only 66 per cent. The British consumer suspects the coal merchants are making too much, and he freely charges that either bad organization or profiteering is the explanation of the price he pays.

More emphasis, however, is laid on the failure of

the coal-mining industry adequately to serve the nation; high costs of coal production threaten to curtail Great Britain's foreign trade, which is vital to national prosperity; coal is wasted at the mines and uneconomically used in both factory furnace and domestic hearth; and here the first allusion is made to electricity and a larger supply of cheap power to industry, with a large annual saving of coal consumed. Only one high

light appears in the dark picture thus portrayed by this committee: the industry has worked out in its agreement of 1921, modified in 1924, a practical basis for the division of proceeds between capital and labor, here termed "a very remarkable achievement."

Before presenting the essential principles underlying the reform of the coal industry, the committee clears away the underbrush that obstructs vision, by rejecting all proposals for nationalizing or socializing

the mines. Those who point with pride to the success of State control of industry during the war are reminded of the reason why: "an unlimited market for war products and no limit to the price which would be paid."

The elimination of private capital by whatever name it may be called is believed to promise no real advantage to anybody; instead, constructive reforms are sought, "without depriving the industry of the essential vitamins of private enterprise," for "experience is overwhelmingly against the successful administration of a business enterprise by a bureaucracy." Italy is now in fact denationalizing, while in Germany "at this moment the State mines are being made over to private companies."

The constructive program of reform set forth in this report starts out with the proposal for the State to acquire control of the coal resources by purchase of property rights from the 4,000 royalty-owners. The purpose of thus vesting in a single central authority the control of the coal measures arises from the conception that in a modern industrial society the State should not undertake creative and productive functions but rather "should see to it that the necessary conditions shall exist in which the creative enterprise and energy of its citizens can most effectively operate."

With 4,000 royalty-owners, there plainly can be no far-sighted or co-ordinated administration of the national mineral estate. In granting leases to State-owned coal, the Royalty Commissioners can select lessees best capable of working the resources efficiently,

THIS report would have the working man a part of the governing body in the operation of coal mines. It recognizes the Pit Committee as a valuable restraining influence on the conduct of mines. It declares State control of industry was successful only because "an unlimited market for war products and no limit to the price which would be paid" facilitated administration. It views many older operations as uneconomic and would like to see them wiped out by a vigorous competition.

which in the majority of cases would be the present mining companies, but also leases might be granted to co-operative societies or miners' guilds, the sole test being capacity to undertake the business.

Amalgamation of companies or of mines up to the limit of efficient units of operation and management should be facilitated, but in the main the initiation of schemes for such grouping "should come from inside the industry," amalgamation being thus "piece-meal, scientific, and in the main voluntary instead of wholesale and automatic." This policy of removing obstacles to larger and better mines is worthy of adoption on this side of the Atlantic.

Next in order is the proposal to alter the status of the miner, from whom the industry is getting neither the best nor all he can give. The British mine worker has a heritage of accumulated knowledge and experience, but his thoughts operate in a single channel, namely, wage negotiations, where moreover there is antagonism rather than co-operation with capital and management.

Except for collective bargaining upon wages, these million British miners, who are citizens of the Empire, have no say in the affairs of the industry in which they spend their lives, although they are just as much affected by the prosperity of the industry as the shareholders. The miner, therefore, cannot be expected to forego any longer an effective voice in policy but the road of advance here pointed out is not to discard the experience of initiative and management on the part of the mine operator but to bring about co-operation between mine-workers and mine-owners on "terms which share knowledge and responsibility for the general policy between the two, but do not impair efficiency in the execution of an agreed policy."

A mine, like a ship, must be under the direction of an executive with authority, "whose duty it is to make decisions and to give orders which must be obeyed." Experience has shown however that a pit committee "both helps the management to come to a right decision and prevents them from coming to a wrong decision." Such pit committees, as well as the district mining councils, should consist of equal representation of management and workers, and their functions would include "the safety, health, and welfare of the workers, and the maintenance and increase of output."

"The interests of capital and labor in these matters are fundamentally the same." Except as these common interests are yoked together, there will continue the antagonism which expends energy which ought to be directed to one common end. Only by accepting the responsible co-operation of the miner can the operator expect to educate him regarding those economic laws which express the necessity of making the industry pay.

An interesting side light is thrown on the British problem by the statement that war and coal control "retarded the natural process of obsolescence," with the result that both labor and capital are engaged in mines

where neither can earn its wage. "Coal ceases to be an economic asset when it is only obtainable under grossly uneconomic and uncommercial conditions"—a stage believed to have been reached in some of the older pits in Great Britain. So it seems, the survival of the fittest is an economic law that must be allowed to operate on both sides of the Atlantic. Therefore, the Committee attaches great importance to the progressive substitution of new mines for the older ones. It is the key to the problems of better housing and of wage disparities. To pool all mines would involve grading down, to open better mines means grading up.

Housing conditions, of course, vary greatly in the vicinity of British mines as they do here in the United States, but the general squalor and lack of sanitation as described in this report are far worse than the worst even in the older camps in our coal regions. Therefore, the committee makes it a cardinal part of its proposal that the Royalty Commission will insist as a condition

of a lease that a generous and enlightened housing scheme is undertaken. It is this power of attaching conditions that gives the State the power to wisely regulate the industry, but that regulation must be based on clearly understood general principles.

Royalties should be exacted not with any aim of making a profit to the State, as the primary need is coal at the lowest possible price for the use of industry in general. The royalties on new leases should be graded

so as to minimize the difference between rich and poor mines, even exempting mines with poor seams.

A National Mining Council is proposed as a part of the machinery for securing full co-operation in the industry, by including more general representation on both sides; such a body could advise the Royalty Commissioners in matters of policy, administer the National Welfare Fund, and keep the public informed on the facts and so allay suspicion. In only one point is it proposed that the National Council have any part in fixing wage rates. In the case of a deadlock, the issue is to be referred to this bipartisan Council and no strike or lockout can take place until its report has been published.

The legislative recommendations submitted perhaps have less interest to the American reader of this report, but throughout the logic of the British situation there described and of the remedies there proposed is a logic that appeals to those of us who seek peace and prosperity for the coal mining industry in the United States. The hundred and thirty-odd small pages sparkle with phrases that help to hold the reader's interest, such as: "the essential vitamins of private enterprise" or "bad housing means a tragic waste of human material."

Indeed, a half dozen sentences can be quoted that brilliantly summarize the fundamental premises of this report: "We are once more drifting into a head-on collision between those who believe nationalization solves everything and those who believe the only course is to leave things alone. It is highly undesirable that a

THE Liberal Party of Great Britain under the leadership of David Lloyd George has brought out a semiofficial program condemning national operation of coal mines but advocating a leasing system closely comparable, it would seem, to the methods of European continental countries where the ownership of minerals is vested in the state and operators are concession holders subject to State regulations which dictate economic policies as well as safe and hygienic operation.

great industry should be made the plaything of party conflicts. There is an immense difference between running an administrative service and producing commodities or raw materials for sale in a competitive market.

"No conceivable reorganization of the industry can evade economic laws and escape the necessity of making the industry pay—unless indeed it is proposed to treat the mining industry in the same way as the Navy or the Army, a point on which the taxpayer would have something to say. Everything, wages, profits and prices, depends directly upon the efficiency both of miner and management; unfortunately—mere love of work for its own sake is not an all-sufficing incentive.

The mainspring of efficiency must be the actual personal responsibility of the mine-owning concern for producing coal at a remunerative cost. It is mainly by enabling the miner to increase his output that better wages for himself, more prosperity for the industry generally and cheaper coal can be secured."

Nearly a half of this short report is devoted to the title, Power, and is an appeal for the better use of coal by its economical conversion into electrical energy. But interesting as is this strong statement and gratifying as are the frank references to the better status of the American industrial worker, it is another story, though an appropriate sequel to the British report here reviewed.

England Five Years After the Peace Still Is "Seeing It Through"

BY E. J. MEHREN

Vice-President, McGraw-Hill Co.

THE WAR is past history in America, but current history in Great Britain. So, indeed, it seems after spending a week in Britain's capital, conversing with her men of affairs and listening to addresses by her business leaders and statesmen. True, there are war scars in the United States, scars that will never be erased. We are mindful of the men who died in the great struggle; we have great numbers of disabled veterans. On the financial side we still have, and will have for many years, a war-swollen budget and correspondingly increased income taxes. But, by and large the war shadow has thinned out. In the last two years we have had "good times." Our war-time income tax rates have been twice reduced. Certainly the way is not blocked by serious obstacles. The difficulties we foresee are merely the fluctuations which, except for the "panic years," one might say are normal to business.

Not so with Britain. The war is only a yesterday with her, and the consequences are still sharp upon her. I do not mean that she is discouraged; that word has no place in the British vocabulary, nor has the state of mind it indicates any place in British consciousness. But the burdens that weigh her, the obstacles still to be overcome, are fully appreciated and are a stock subject of discussion with all her thinking men.

To enumerate some of the troubling factors: 1. There is still large unemployment—though the amount is lessening. 2. There is marked depression in the "engineering trades," as they are called here—ship-building, machine-tool building, and the metal fabricating industries generally. In construction there are few large projects in hand, though there are a few that, after long delay, now seem likely to be taken in hand. 3. A new housing bill, that will again dip heavily into the national and into local government treasuries—and increase, accordingly, national and local tax burdens—is before Parliament. 4. The income-tax rate on even small incomes is 4 shillings 6 pence per pound sterling, or 22½ per cent. The super-taxes are very heavy. 5. The Continental problem is acute and the consequent uncertainty, the upset exchanges, the diminished purchasing power, curtail British export markets. 6. Finally, the never-ending exchange of views, with their Continental war Allies, on German reparations, keeps before the British people constantly the fact that peace, though declared five years ago, is not yet here. There

is cessation of military activity; there is not that accord which is peace in actuality.

In private conversation one gets an even more serious picture of England's difficulties, for there the talk turns to social conditions. Briefly, the burden of these conversations can be reduced to just this: that the altruistic promises of war times and the coddling of politicians have taken from the mass of British workers a sense of responsibility for their own welfare and led them to expect the government to take care of them.

Such an attitude, of course, leads, and has led, to shiftlessness, inefficiency when at work, failure to provide for the rainy day—in a word, all of the economic vices of a dependent, spineless people.

The worst of the difficulty is that no one with whom I have spoken about this attitude of the people seems to have any hope for early improvement. The politician—not the statesman—is the ruler of the day, and as with us, he does not hesitate to sell the public treasury in order to advance his personal interests.

Withal, though, it should be repeated, that the Englishman is not discouraged. He has lived through a lot. He hopes that he will live through this trying period, and that a better day will come.

His way is not our way. We would think that his more or less complacent attitude might be fatal. He believes that the situation will turn out all right; we would fear that it would turn out all wrong unless vigorously handled. (One recalls our Unemployment Conference of some years ago.) We, I hope, would turn, so long as possible, to private measures of relief. The British have turned to the Government. The difficulties, of course, were very great; the amount of unemployment, for example, quite large. Possibly with similar conditions we would have been forced to a similar solution, but I am inclined to believe that the British tap the national treasury with less hesitation than we. The actual war, let us recall in possible explanation, lasted twice as long for them as for us.

But though our methods might differ from those of the British we cannot withhold our admiration of their sterling qualities. Similar conditions would put us in a panicky condition. They go on hanging out their sign "business as usual," confident that eventually all will be well.

Looking back on their long and brilliant history, we, too, can feel confident that somehow the Briton will come out on top. Trial and difficulty develop stamina and character. They are developing them right now in business circles. In the wage earning classes the tendency is in the opposite direction. Eventually, under the example of conscientious leaders, even that tide should change.

In Any Coal Mine Electricity Will Bear Watching*

Use of Electric Current Underground Is Safe Only if Properly Guarded—Shock, Gas Ignition, the Explosives Hazard and Mine Fires are Some of the Dangers to be Forestalled

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IN ALL coal-mine applications electricity cannot be considered as other than a hostile friend. Its service to the industry is inestimable, its utility unquestioned, yet just so long as this invisible power is not adequately and scrupulously safeguarded, its hostility is liable to be felt. Although the adoption of this form of energy has done much to reduce the hazards of shotfiring and mine illumination, it must be carefully handled even in these uses. In fact, it will bear watching everywhere. And in order to reduce its hostility, mine operators should give serious thought to the prevention of shock, to the avoidance of dust and gas ignitions, and to the elimination of the explosives hazard, as well as to the prevention of haulage accidents and mine fires.

In making provision against electrical shock, the primary consideration is the voltage of the circuit. No one can be sure that he will be immune to even a 110-volt circuit, provided he makes such complete contact with it that the full current passes through his body. As the potential of the conductor increases so does the danger incident to contact with it.

Because of a lack of room, insufficient light, the presence of moisture and for other reasons, the underground worker is less readily guarded than the man employed upon the surface. All stationary motors underground, as well as switchboard frames and metallic casings containing electrical parts should be permanently and effectively grounded.

Substations and other places where it is dangerous for men to congregate or loiter, should be fenced off and only such persons as are required to perform the

*Abstracted from a paper by Mr. Ilsley, presented before a recent safety meeting of the National Safety Council, St. Louis, Mo.

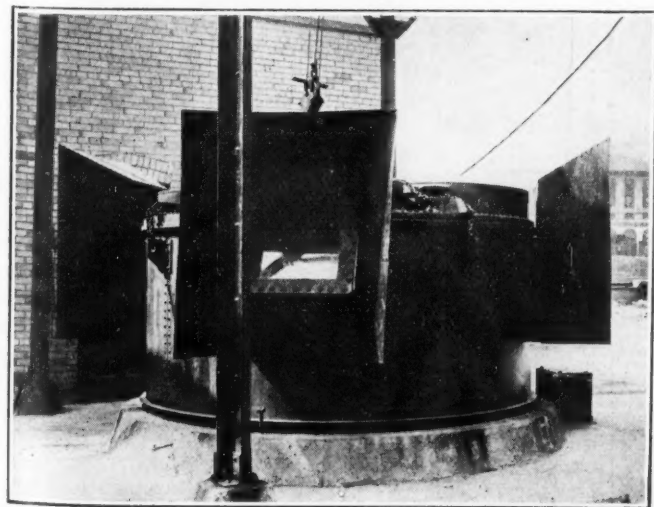


Fig. 1—Testing Gallery of the Bureau of Mines

In this or a similar chamber all manner of electrical devices for use in mines are subjected to various electrical tests to determine their fitness to bear the permissible label. Observations may be made through the shielded windows.

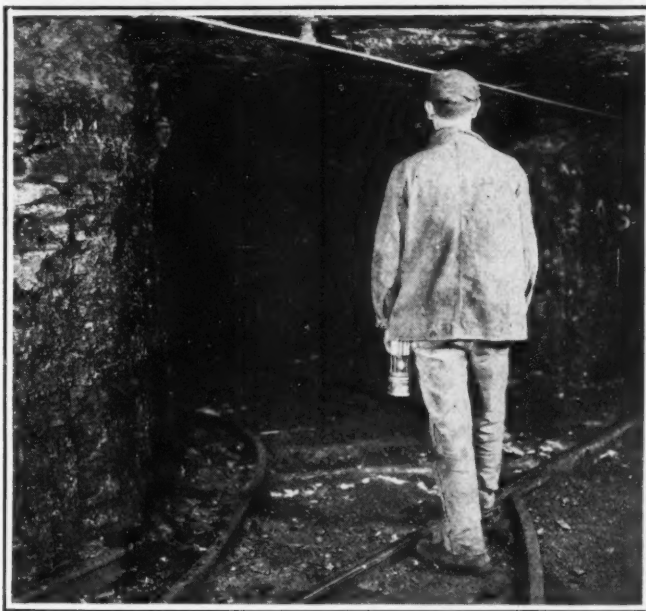


Fig. 2—An Unguarded Trolley Wire

This trolley wire extends across a room neck where loose rails have been stored along the rib. A man entering this room is liable to strike his head against the trolley wire or to touch it with a drill or auger held upon the shoulder. A serious accident may result.

routine work of the mine should be permitted to enter the inclosure. Maximum feasible clearance should be allowed all conductors and in so far as practicable they should be confined to one side of an entry or other passage.

EXPOSED CONDUCTORS SHOULD BE GUARDED

Where of necessity men must work regularly under trolley wires or other conductors, these should be guarded. When men are actually working upon an electric circuit, precautions always should be taken to render it impossible that such circuits should be unexpectedly energized by the closing of a switch or by some other means.

A recent step toward safety in coal production is the wireless mine. Though the chief purpose of keeping all conductors out of the underground workings is to obviate the explosion hazard, this provision greatly reduces the danger from electrical shocks. Two large operators already have begun the use of storage-battery locomotives for all classes of work underground, thus doing away with all permanent wiring inside the mine.

Second to the danger from electric shock is that from gas ignition. Three conditions are necessary to render possible an ignition of gas from an electrical source within a mine. These are: (1) An accumulation of methane or other inflammable gas; (2) a flash or arc from an electric circuit or machine; and (3) the flash or arc must take place at the point where the accumulation of gas has occurred.

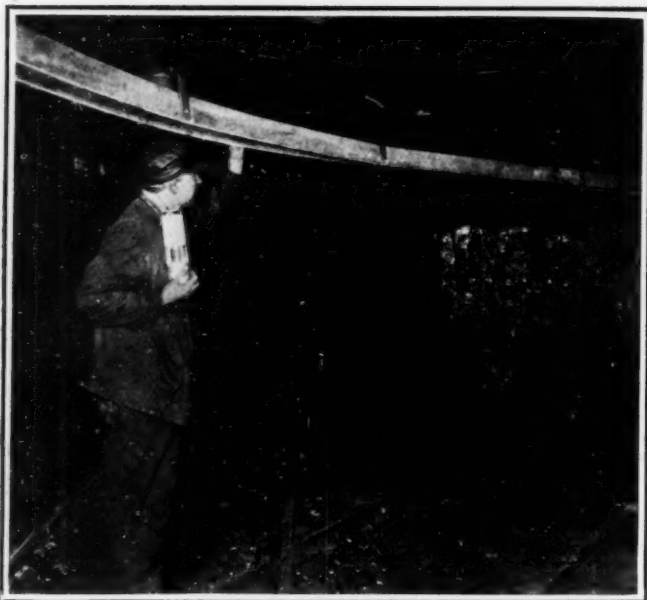


Fig. 3—Trolley-Wire Protection Is Good Insurance

Where trolley wires or other conductors cross room necks they should always be inclosed by guard boards held by strong iron braces affixed to the trolley hangers. An occasional bump on an unwary head is much better than a death-dealing shock.

For methane the proportion of intermingled gas necessary to form an explosive mixture lies between 5 and 15 per cent. The spark or flash liable to cause an explosion may be extremely minute. For instance, the tiny spark that may be evolved from a small hand-operated blasting machine is sufficient to set off the gas; or the heat of a 2-volt, 1-amp. electric bulb is likewise ample.

Accident prevention, therefore, signifies keeping such tiny sparks away from the places where gas may possibly accumulate. Pieces of electrical apparatus approved by the Bureau of Mines for use in gaseous atmospheres are safeguarded in various ways. Thus, electric lamps are provided with a bulb-ejecting device that kicks the bulb out of contact in case the glass is ruptured, thus cooling down the glowing filament and preventing it from igniting any gas surrounding it.

In like manner the spark-producing parts of approved electric motors or other machines are so inclosed that any sparks or flashes evolved within the equipment during operation can only ignite the mixtures contained within the compartment walls.

In many mines much apparatus, from a safety viewpoint, may be considered substandard. Such equipment, while built along explosion-proof lines, would in many cases allow flame to pass through the joints. The advantages inherent to permissible equipment are as follows: The apparatus is constructed in accordance with drawings on file with the U. S. Bureau of Mines and the design cannot be modified without due consideration to the effect the changes might have upon safety. Special attention is given them while in process of manufacture. Most companies have special factory inspection sheets that must be filled out for each approved machine calling attention to numerous parts that need specific treatment.

Permissible machines are subjected to actual tests to prove their mechanical strength. They are tested in gas to establish their ability to retain all flame within their inclosures, inspected to insure that they have no through openings leading to their interiors and to see that all bolts are securely fastened. Permissible com-

partments are given special attention at the points where wires enter them. These places are frequently overlooked in unapproved equipment.

In the recent past more attention has been given to the prevention of coal-dust explosions than to any other class of mine hazard. The conditions that favor such explosions from electrical ignition are a dense dust cloud in the presence of an electric arc or flash.

Dust may be raised in a cloud within the mine workings in any one of several ways. For example, a fall of coal or rock may stir up any dust on the sides or bottom of a roadway. A runaway trip may knock down timbers and release the dust resting upon them, or a blown out shot may raise dust in a room. A coal-cutting or loading machine operating in dry coal beds may, in the regular course of daily operation, create clouds of dust.

Electric flashes may occur from a broken lamp bulb, from the blowing out of a fuse, by the operation of a circuit breaker, by the throwing of a switch, the flash of a commutator, from the arc of a trolley wheel or from a broken trolley wire, light wire or feeder, from a short circuit of lighting or feeder cable, or in one of many other ways.

Direct ignition does not constitute the greatest danger of a dust explosion but rather indirect ignition. That is, while it may be difficult to secure exactly the right combination for an electric ignition of coal dust, it is comparatively easy to ignite a small pocket of gas. Such an ignition in turn may stir up sufficient dust to propagate the explosion throughout the mine and prove a hundred times more disastrous than the gas explosion alone would have been.

In seeking a preventive for dust explosions, therefore, one must not only eliminate direct ignitions of dust by electric arcs, but also prevent ignitions of gas. In case gas ignitions occur, the dust throughout the mine either should be so thoroughly saturated with moisture or intermingled with inert non-combustible material as to be incapable of propagating an explosion.

In present-day mining, electricity and the safe han-



Fig. 4—A Permissible Electric Cap Lamp

For actual work at the face the electric cap lamp has largely supplanted the old flame safety lamp. For this purpose, it is lighter, more efficient and gives a steadier and more powerful illumination.

dling of explosives are closely associated. Electrical shotfiring is highly popular. A number of electrical problems are involved in bringing the current to the detonator when and in the quantity needed, as well as in keeping it away from the detonator at all other times.

TRANSPORT EXPLOSIVES IN INSULATED BOXES

To fire an electric detonator may require only 0.35 to 0.50 amp. of current. As a consequence, all stray currents must be carefully kept away from the ends of the detonator wires. Nor can anyone be careless with these wires when near an electric circuit, no matter how low its voltage or how seemingly insignificant the current carried. Detonators accordingly should be carried to and from the mine in insulated boxes, and when preparing for a shot care should be taken to see that the ends of the wires do not come

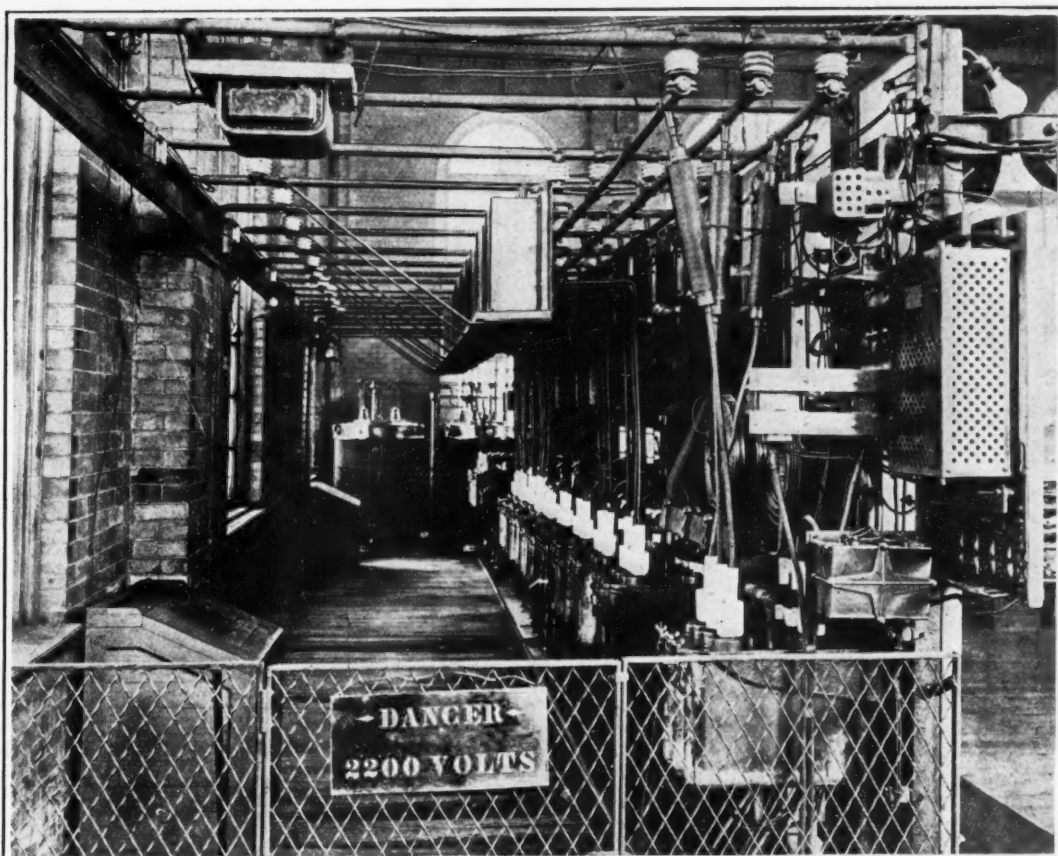
lines extend outside the mine they should be protected from lightning discharges. Ample switches should be provided for keeping the circuit open except when shots are being fired. Rubber-covered wire should be used for temporary and portable firing lines in order to minimize the danger of shots being fired prematurely should these conductors come in contact with other circuits.

Attention of the Bureau has been called to the overheating of detonator leg wires and the ignition of gas from this cause. A preliminary investigation of this hazard has resulted in the following recommendations: (1) Detonators should be connected in parallel-series, series-parallel, or straight series. (2) The current should not be allowed to flow through the connections more than 0.2 sec. (3) Electric detonators with copper lead wires should be used. (4) The standard volt-

FIG. 5

A Safe Substation

All danger points in substations should be effectively fenced in. The word "Danger," which is well understood nowadays by every one in America no matter what may have been his native tongue, should be prominently posted at conspicuous points.



in contact with live electric circuits or other electrical apparatus.

Black blasting powder is readily ignited by electric flashes; consequently great care should be exercised to keep the containers of such powder away from all electric wires and apparatus. All powder should be transported in special cars or boxes, so constructed that no metal on the inside of the compartment, such as nails, screws or bolts, may carry electric current from the outside to the explosive.

Not all blasting machines are safe for use in gaseous mines. Even the little hand-operated device commonly used for firing from one to three shots is capable of producing a spark that may ignite gas. Machines on the permissible list of the Bureau have been cured of this danger and while satisfactory for single-shot work, they do not emit a spark capable of igniting methane.

Permanent lines used in electric shotfiring should be kept away from other electric circuits. Where such

age of the firing current should be the lowest that will satisfactorily fire all of the detonators as connected. Thus, if a 220-volt circuit is ample to furnish at least 2 amp. of current to every detonator, a 600-volt circuit should never be used. (5) The firing circuit should not be grounded.

In any shotfiring system, the circuit should be so arranged that not less than 1.5 amp. will pass through the bridge wire of each detonator. Though a small current may fire some detonators, they vary appreciably in the resistance they offer, and sufficient current should be provided to assure the detonation of all of them.

Haulage accidents rank second only to falls of roof and coal in the toll of life and limb which they exact. Statistics show that 341 fatalities occurred underground in the year 1921 and 340 in 1922 from mine cars and locomotives; 25 and 32 fatalities occurred on the surface from the same causes during these respective periods. Though the record of these accidents is

not segregated as to the type of haulage, beyond question a large proportion of them occurred in connection with electrically propelled locomotives.

THIRTEEN PERTINENT SAFETY SUGGESTIONS

The following suggestions may be offered as partial remedies for electric haulage accidents. (1) Provide good brakes on all haulage equipment. (2) Provide a good roadbed, track of ample weight and suitable frogs and switches. (3) Provide a separate manway; keep the haulageway clean. (4) Where men must travel on haulageways, provide sufficient plainly marked man-holes or refuge holes and proper means of access to them. (5) Keep roadways well lighted. (6) Provide ample clearance on at least one side of the roadway. (7) Keep the timbering in good condition. (8) Provide a tail-light on all trips. (9) Provide ample headlights. (10) Provide derailleurs or runaway switches on

bulbs may start a fire from the heat generated by them if they are installed too close to flammable material.

Many of the foregoing dangers may be obviated by the proper installation of apparatus and circuits. Electrical machinery should be installed in spacious, fire-proof rooms and be well supported on substantial frames set on fireproof foundations. Insulators should be placed sufficiently close together to keep the wires from touching coal, rock or timbers. Wires should never be strung over timbers or in places where they cannot be readily inspected. Temporary wiring should be discouraged. Stations containing oil-filled equipment, such as transformers, should be so arranged that if oil is spilled it will not escape from the room.

All circuits and apparatus should be of sufficient size to perform their functions without overheating and should be protected by current-interrupting devices against sustained overloads. Automatic reclosing cir-

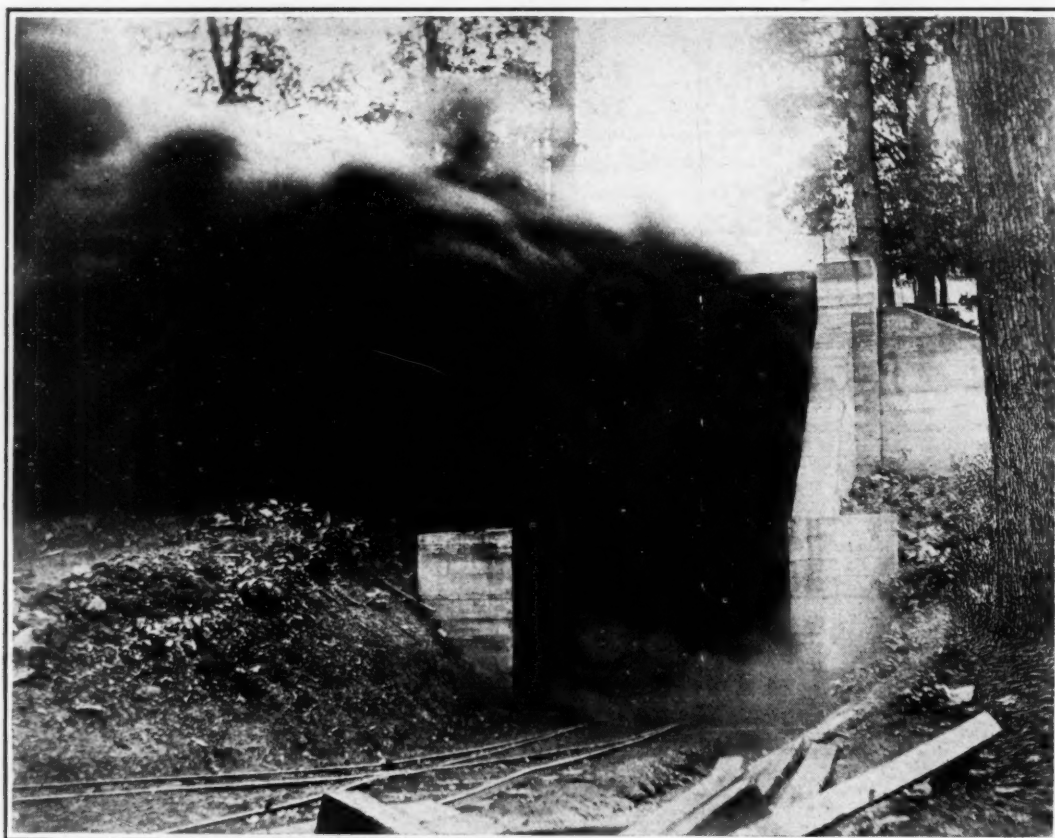


FIG. 6

How a Dust Explosion Looks at the Mine Mouth

This particular explosion was staged purposely in the Bureau of Mines experimental operation near Pittsburgh, in order that its effects might be closely studied. Much of our present-day knowledge of how to make coal mines safe has been derived from just such experiments as this.

all slopes and planes and gongs on all locomotives. (11) Prohibit excessive speeds. (12) Enforce discipline, especially in regard to riding on locomotives or trips. (13) Prohibit the making of flying switches and eliminate the pushing of trips.

Next to open lights, electricity presents one of the most prolific sources of mine fires. Any machine that is overloaded or that has become worn out in service may break down, causing electric arcs and flashes capable of igniting any inflammable material that may be at hand. In fact every electric circuit is a possible source of fire. Circuits may cause flashes when the wiring becomes grounded, when the circuit is opened under load (accidental breakage of the wires by a fall) and by the short circuiting of conductors of opposite polarity. Certain electrical devices, such as switches and circuit breakers, flash and give off arcs during normal operation. Oil-filled apparatus is especially dangerous if the oil becomes ignited, due to the failure of the equipment. Stationary electric lamp

cuit breakers are proving successful on main-line circuits, but would probably add to the fire hazard if installed on branch lines.

Rooms containing electrical equipment should be kept free from inflammable substances. All wiring should be kept clear of all such materials, and firefighting equipment should be kept in every underground station. This should be of such a nature as to be effective in coping with electrical fires. Grease and oil should not be allowed to collect on or about electrical apparatus.

In certain cases electricity has increased the fire hazard in mines, but when it is used for mine illumination or for shotfiring the opposite is true. The electric cap lamp has replaced thousands of open lights which have always been a potential fire hazard. Electric shotfiring does away with the fuse or squib and in many cases with the open light for igniting it. It thus appreciably reduces the fire risk. One chief mine inspector affirmed that the electric cap lamp alone is worth the cost of the Bureau's electrical section.

Rocky Mountain Men Strike New Note in Dusting

All Adobe Not Equally Good—Danger of Siliceous Dust Questioned—Best Dust Wasted in Surface Grinding—"Mudizing" Idea Stirs Up Debate—"Days of '49" Turns Rock Springs, Wyo., Into Rip-Roaring Town

COAL MINING men from all over the mountainous West spent three days in Rock Springs, Wyo., last week delving into the problems of rock dusting and coal loading. They also banqueted royally with the folks of Rock Springs, took many a whirl at the old-fashioned faro and roulette, visited the mines of the region and watched a Wyoming state first-aid meet on the last of their three days—Saturday, Aug. 9. It was the summer session of the Rocky Mountain Coal Mining Institute.

The technical sessions brought out data about the rock-dusting methods now prevalent in New Mexico, Utah and Wyoming and which are getting started in Colorado and the results of some loader experience, principally that of the Union Pacific Coal Co. at its Reliance and Hanna mines. These sessions also gave opportunity for some discussion of mine fires and methods of controlling "bumps" in coal seams, not to mention some frank talk about what ails the coal industry. President Eugene McAuliffe of the Union

Pacific Coal Co. was a main contributor to this. President William Littlejohn of the Institute and Vice-President Brunell presided, aided and abetted by Secretary-Treasurer Benedict Shubart.

The hospitality of the dusty city of Rock Springs—a community of 9,000—made a deep impression upon the visiting Institutists, many of whom had never been in Wyoming before. They had pictured the town as the dirty western coal camp it was during the early years since coal began to be produced there in 1867. They found some handsome buildings, including the new Elks home where the meeting centered, some stores, a theater, a lighting system and a hotel or two that would do credit to a much larger city, and about everything else considered necessary in small city life except one municipal ingredient—green grass. The blades of grass in Rock Springs can be counted on the fingers of an armless man—almost.

The faro and roulette of Rock Springs were not an integral part of the city. They were resurrected from the distant days when Rock Springs, was a roaring gambling center along with Butte, Mont., Carson City, Nev., and the other famous hells. "Them days is gone forever," but a few Rock Springs gentry got out their four-gallon hats, slipped unaccustomed feet into high-heeled boots with scroll work on the legs, slung big sixes on their hips, and opened up a lot of games in the "Days of '49" entertainment on the second night

of the meeting. The institute never fails to "register."

The banquet on the first night, at which George B. Pryde, vice-president of the Union Pacific Coal Co. presided, was another handsome bit of entertainment by the city. About 400 were present. Mr. Littlejohn, whose brogue is a standing target for fun at all Institute meetings—Ben Shubart contends Littlejohn speaks with a thistle in one hand and a shamrock in the other

—was one of the speakers.

S. W. Farnham, chief engineer of the Goodman Manufacturing Co. was another and T. T. Read of the Bureau of Mines added a gracefully humorous wind-up. Then an excellent local orchestra and the girl scouts of the town entertained, the girls staging a take-off on the day's technical session of the Institute, even to the cigaret which K. H. Marshall of the Bureau had carried to the speakers' table.

The summer meeting wound up Saturday with a demonstration by the Bureau of Mines of dust explosions following the state first-aid meet, in

Rock Springs' First-Aid Park. The only business transacted by the Institute was the unanimous adoption of a long report by its safety committee and a decision to encourage the states of Wyoming, New Mexico and Utah to follow the lead of Colorado in recognizing the miners' competency certificates issued by that state.

The adobe dusting system used by the Phelps Dodge Corporation at its mines in Dawson, N. M., was described by William Moorehead. He told how the dust is gathered outside the mine by a clamshell bucket and hauled in railroad cars to the mine where it is loaded into mine cars. It is scattered on the main haulways by hand after all loose coal has been removed from the mine at least down to a point three inches below the rails. This dries out and is spread both by passing trips and by trees which are dragged through the mines at intervals, usually during the night.

Also adobe dust is sun dried and screened outside the mine and the finest of it, passing a 20-mesh screen, is blown into the intake air course at intervals through holes in the stoppings. Further direct application to roof and ribs is made by using the Cement Gun. The wet method of deposit is far more satisfactory than any other, Mr. Moorehead said, because it reaches every crevice and causes the rock dust to give a strongly adherent coat to the roof and the sides of the entry. Also it can be deposited in a thicker coating than dry

"MUDIZING," A NEW SAFETY TRICK

ONE of the most talked of subjects at the Institute meeting was the sort of safety "dusting" now practiced by the Lion Fuel Co. at Wattis, Utah. Superintendent W. J. Reid saves the cost of grinding rock dust by substituting adobe dust mixed thinly with water. This is sprayed through the mine by a blower and tanks, making a coating about 1-32 in. thick. He insists it is as effective as dry dust and is so cheap a process that he can afford to cover the mine frequently enough to keep down the percentage of accumulated coal dust. He has been "mudizing" about two months and says the coating dries in 48 hours, leaving thereafter a constant dusty surface which he thinks would be effective in stopping the spread of explosions. He has doubters.

fine dust. The mud coating protects the coal from slacking.

The Phelps Dodge Corporation also waters its mines thoroughly, carrying water lines to within 20 ft. of every face, but main dependence is placed upon the dust. This is not only applied wet and dry as described, but also is provided in the form of rock-dust barriers. Roof is brushed up high enough to erect 16-trough batteries and still leave 6 ft. of headroom. In order to prevent sagging of the troughs in the middle they are erected, on wide entries, in double rows. Mr. Moorehead said his company does not have any fixed maximum lengths for such troughs but they are always short enough to avoid bending under the weight of the rock dust—which is composed of concentrator tailings from a near-by mill containing 97 per cent incombustible matter. About 50 cu.ft. of this dust is loaded on each barrier of sixteen troughs.

Mr. Moorehead said the adobe dust spread on the roadways costs 10c. per running foot, and when stirred up according to the Phelps Dodge plan, is good for one year. Therefore 6,000 ft. of entry could be spread with dust for \$600 a year. One man is assigned to every 6,000 ft. to clean up the roadway and rake over the dust. This costs \$1,900 a year, figuring on 250 days' work at \$7.60 per day. Thus the cost of upkeep per running foot of entry is 31.7c. per year, and this plus the 10c. per foot for application makes the total cost on roadways 41.7c. per year. "Mudizing" entries on the other hand costs the operator only 0.013c. per running foot.

Ninety-nine per cent of the coal operators do not know definitely how explosive their mine dust is, according to K. L. Marshall of the Bureau of Mines, who made a short but pointed talk on coal dust, using samples to illustrate what he had to say. Altogether too many mine men think the dust on their roadways is not fine enough to be dangerous. He declared that in taking a 6-in. strip sample across any heading it is easy to get 4 lb. of dust fine enough to be explosive.

In coal that is without face planes, such as Pocahontas; as much as 10 per cent of the road dust will pass through a 200-mesh screen and therefore is most readily explosive and 20 per cent will be finer than 20 mesh, which is the Bureau's maximum size for dust that will participate in an explosion. In coals that show face planes, such as average Pittsburgh and Rock Springs coal, the percentages of fineness on roadways would be twice that of Pocahontas. Thus, according to Mr. Marshall, every mine is loaded with explosive dust, unless protective measures are taken, and the sooner the coal men of the country realize it, the better.

He said coal dust of 200-mesh fineness has no dimension greater than one one-thousandth of an inch and much of the roadway dust in the average mine has the impalpability of cigaret smoke. Hence the ease with

which it remains in suspension in mine air and hence, also, its readiness to propagate an explosion. In ordinary densities it will burn at a speed of 6,000 ft. per second, which is faster than ordinary powders, and as rapid as dynamite.

In the discussion that followed T. T. Read of the Bureau of Mines interestingly explained why fine coal dust is so inflammable. He said that coal dust in the air or on the roof, ribs and floor burns swiftly because the heat from each particle is communicated readily to the next particle. But if rock or adobe dust is present, the coal particles are separated from each other by barrier particles of non-combustible matter and the heat is absorbed by them. However, the rock or adobe must be of equal fineness with the coal if they are to be effective. Otherwise they would not remain in suspension with the coal and could not be present

between coal particles when their presence was needed. Furthermore, this incombustible dust must be of a character that it will not absorb much moisture from mine air or it will become pasty, and thus ineffective. It must dry at the same speed as coal dust to avoid this separation from the coal. Few adobes will do this, so he places little confidence in adobe.

Eugene McAuliffe, president of the Union Pacific Coal Co., wanted to know whether it is essential to grind either rock or adobe to great fineness. If distribution of coarser adobe will do, the operator depending upon it to disintegrate in the road-

ways and get proper dissemination by the various stirring agencies, then his company would not go to the expense of installing a grinding mill. He got some comment on both sides of the argument, but the meeting came to no general decision.

Dan Harrington, now with the Utah Fuel Co. and the United States Fuel Co. in Utah, said ordinary adobe dust would do well without fine grinding in main intakes but that its character must be known definitely before dependence can be placed on it for moist mine interiors and return aircourses. Some adobe absorbs as much as 5 or 6 per cent of moisture out of mine air and therefore will not give satisfaction. Other adobe absorbs none. This type can be used without fine grinding, but when a mine does not have that kind of adobe it should use finely ground rock of some sort.

President Littlejohn said Utah had decided upon the use of finely ground limestone for barriers and for the dust zones nearby, but that adobe would be used elsewhere in Utah mines. W. D. Brennan general manager of the Phelps Dodge mines held that dry adobe is fine enough merely crushed. It does not have to be pulverized. Hand raking, ordinary travel and the other methods of periodically disturbing adobe dust in the mines at Dawson reduce its size and distribute it as effectively as though it were ground.

DAN STARTS A DUST ARGUMENT

IS FREE silica in rock dust damaging to miners' health? All authorities in the coal industry have said it is and therefore all operators contemplating dusting their mines have felt that they must find a dust with practically none of it. Now comes Dan Harrington, one of the best known mining safety engineers in this country, telling the Rocky Mountain Coal Mining Institute that it is not so. He believes there is so little free silica in shale or rock dust that it cannot have any material effect on miners. Sharp-edged material ground down to 200-mesh fineness is so fine that it will not set up an irritation in the lungs, says Mr. Harrington. One dust is no more troublesome than another, he holds, and none of the fine dusts will cause trouble unless it is breathed in great volume. Average rock or adobe dusting of a mine would not produce this quantity.

His company takes it in from the streets and surface outside the mines. Only 10 per cent of it may be of 200-mesh fineness, but if any attempt were made to screen it, the real fines would be lost. So it is spread without screening. He pays boys 4½c. a sack to shovel it up at places where it appears to be finest. The cost of getting it to the mine is another 2c. This is much cheaper than grinding. Crushers would not work on adobe in wet weather, even if they were used.

Mr. Brennan believes barrier dust should all be of 200-mesh, but roadway adobe works well without any preparation.

WANTS LITTLE SILICA, CARBON OR WATER IN HIS

Capt. Jack Smith of the Union Pacific Coal Co. described the more or less well-known methods of dusting in Illinois, closing with a few conclusions of his own about dust. He advocates fine grinding, for it is his idea that only fine dust is efficacious. It should be practically free from silica, however, for the sake of the miner's health. It should have less than two per cent of combustible matter but in no case should it contain over 10 per cent. It should not be capable of absorbing more than two per cent of moisture from mine air and should be of light color to enable observers easily to determine when the slow admixture of coal dust with it begins to bring it to a combustible stage.

Fine grinding of any sort of material is cheaper in the long run, said Charles Leger of the Royal Fuel Co. He quoted John E. Jones of the Old Ben Coal Corporation of Illinois, a pioneer and close student of dusting, as saying that when dust is too coarse to be distributed by a blower, and is applied by hand, the cost is about \$12 per 1,000 lineal feet of entry, whereas blower dusting costs but 75c.

President Littlejohn thought a combined crusher and blower will soon be produced to do its crushing as it distributes the product. Thus none of the fines will be lost. Mr. Read had just remarked that he had seen most of the fine and really desirable dust escaping from a crusher in southern Illinois that tried to gather the pulverized material in a cyclone collector.

TILTING-BOARD BARRIERS UNDER A CLOUD

Reverting to the subject of barriers, Captain Smith said the so-called "concentrated barrier" once used in southern Illinois, made of a platform of wide planks each board tilting and dumping its dust in suspension when disturbed, was a failure. The boards warp slightly and do not trip when the trigger works. They are being replaced by steel construction.

At this point Mr. Harrington injected the opinion that the silica content of any rock dust is not a factor and should not be taken into consideration by the mine operator. The percentage of siliceous matter in any rock dust is so small and the quantity of rock dust in suspension in a mine is so trivial, at worst, that it cannot be any more injurious to the miners' health than coal dust or any other dust.

Mr. Read agreed that it would not be harmful in ordinary proportions after it was machine-applied, but that where dust is spread on roadways and stirred with rakes and brushes to get distribution, it might possibly be harmful if the silica content was high.

Then came a discussion about "mudizing." P. H. Burnell of the Lion Coal Co. described a machine his company is using at Wattis, Utah for the purpose. Adobe dust in water is drawn out of a tank by a centrif-

ugal pump, and sprayed on roof and ribs in a layer about ½ in. thick. The first coat washes down all the dust it encounters, penetrates everywhere and makes a perfect application at a low cost. The machine can coat about 1,500 ft. of entry in an hour.

Though it is true that coal dust and water will not mix, this adobe mud and coal dust will. A safe percentage of incombustible matter in the coal dust is certain, he said. It dries in 48 hours and thereafter, presents a surface that is dusty as chalk. The roof and rib surfaces offer little opportunity for coal dust to be deposited, and if roadways and faces are kept well sprinkled, he thinks, there can be little danger from coal dust.

"But that mudizing doesn't put much incombustible dust in the roadway," said E. H. Denny, district engineer for the Bureau of Mines. "How long will it take your mud to slough off a little and mix with road coal dust?"

"I don't know," replied Br. Burnell, "but mudizing is cheap enough to be applied often and if it is carried clear up close to the face and the mine is well sprinkled, there ought not to be much coal dust. It would be an absolutely dustless mine."

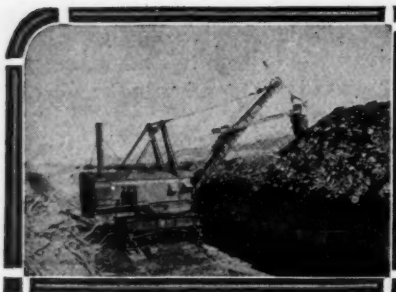
Mr. Denny remarked that it is next to impossible to get a mine perfectly clear of dust and that 5 oz. of fine coal dust per lineal foot of roadway is plenty to run a rip-snorting explosion.

(Account of Rest of Meeting Will Be Published Next Week)

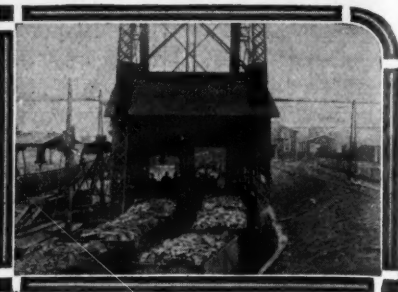
ELECTRIFICATION GROWS at South Wales collieries. Great progress has been made recently in the electrification of the South Wales collieries, and, with the higher labor costs as a result of the recent agreement, a fresh stimulus has been given to the work of converting colliery power from steam to electricity. At the same time there is a great divergence of opinion on the question of central supply stations for a group of collieries. An instance of this is the total destruction of a central supply station at Ferndale, supplying power to eight collieries, which caused a shutdown of a month of all the pits involved. As a remedy for such a contingency it is proposed to interconnect a number of stations. Cardiff and Swansea are both increasing their generating plant for supplying electricity to collieries, and the output of the Cardiff City Station has more than doubled since the war. The local authorities at Newport, Bridgend and Neath are also augmenting their plants.

THE BUREAU OF MINES is conducting an investigation of mine wastes in relation to stream pollution. The investigation has been placed under the jurisdiction of Dr. Sayre, Chief Surgeon of the Bureau of Mines, in co-operation with the Public Health Service. It is being actively conducted by H. F. Yancey with headquarters at Pittsburgh. It is understood the investigation will require a year's time. Effort will be made to determine the facts as to pollution of streams by mines and remedies therefor with a minimum disturbance to the mining industry.

RECENT ESTIMATES of Utah's coal resources place the tonnage at 196,458,000,000 short tons. It is estimated that this is sufficient for the whole of the United States for 250 years. The state's coal mines employ 4,500 men regularly with an \$8,000,000 payroll.



News Of the Industry



Coal and Other Business Improving

Every Indication of Revival of General Business—Interest Rates Low—
Increase in Tidewater Dumping—Law of Averages
Would Indicate Hard Winter

BY PAUL WOOTON
Washington Correspondent of *Coal Age*

Indications of a decided revival in business were being registered throughout the past week in the central offices in Washington of the far-flung systems of fact and figure finding, which are maintained by the Government and by more than three hundred trade associations. More than the usual significance is attached to these returns, as the country with its abnormal gold reserve and with unprecedented capital to be had at interest rates which have dropped to a new low level, could burst into a boom almost overnight. The abundance of credit is indicated by the fact that the Federal Reserve system stands at 83 per cent, far above the 40 per cent margin of safety provided by law. The explanation lies in the fact that the banks are so well provided with funds that they do not need to rediscount their loans.

Though the improvement in the business situation has extended over several weeks, the psychology which is a necessary essential to any big upturn of industrial activity has just begun to crystallize. It is admitted frankly that with it are elements which well may lead to inflation.

Coal already has responded to the improvement in business, and is expected to reflect promptly the prospects of a Fall and Winter likely to be marked by great industrial activity. There has been a sharp increase in tidewater dumpings. This reflects the increase in industrial activity in New England and at other points which secure their coal supplies from the coastwise trade. Dumpings have been at a rate higher than any level reached since March and close to the maximum for the year. All rail shipments to New England have increased. There has been a gradual increase in the quantity of coal dumped at lower lake ports. The tonnage dumped thus far this season compares favorably with that of normal years. The movement up the lakes has been retarded because coal has been slow in moving off the upper lake docks, but indications now are that this movement will be rapid from this time forward and there is every reason to expect that the close of navigation will show that this trade has been equal to that of the average year. The better situations in the steel industry and in automobile manu-

facture are regarded as being of particular significance.

As no one expects the production of coal in 1924 to fall under 450,000,000 tons, production at an accelerated rate cannot be delayed much longer. As the railroads last year handled in excess of 10,000,000 tons of coal for a period of sixteen weeks, there is no serious talk of a car shortage. At the same time, it is admitted that circumstances easily could combine so as to make for transportation difficulties in handling the considerable volume of the year's production which is yet to move.

If a spurt in industrial activity should materialize, as the signs now indicate, and should Winter weather set in early, difficulties might be encountered. Weather bureau records show that an unusual amount of mild Winter weather has been enjoyed during the past seven years. No long-time weather forecasts are made by responsible persons, but according to the law of averages which has been established during more than the one hundred years for which records are available, the prospects are for a severe Winter. The unknown quantity in the problem is the quantity of coal in storage, but since that probably did not exceed 36,000,000 tons on Aug. 1, there is insufficient margin to carry industries long if they are to be called upon for increased outputs.

Beckley, West Virginia—Next Objective of Union

John L. Lewis, international president, United Mine Workers of America, Ellis Searles, editor of the *United Mine Workers Journal*, Oral E. Garrison, organizer, C. Houck, international legal department, motored from Charleston to Beckley, W. Va., arriving in the afternoon of Aug. 7. An inspection was made of the headquarters of District No. 29, which property is owned by the International organization, and a conference held with several of those who have been identified with the United Mine Workers.

Being interviewed, Mr. Lewis had nothing to say, but Ellis Searles remarked that immediate steps would be taken to reorganize the district operating it from the Beckley headquarters.

Another Merger Rumored

Rumors are rife but not generally credited that some of the larger smokeless concerns in southern West Virginia had recently been approached with a view of merging them into one big company. The companies named are the New River Co., Macdonald, W. Va., the E. E. White Coal Co., Glen White, W. Va., the Pocahontas Fuel Co., Pocahontas, Va., T. E. Houston interests of Cincinnati, Ohio, the Tams interests in the Winding Gulf region and the Wentz interests in the New River and Virginia fields.

Industrial Conference Board Sees End of Slump

The business tide has turned, is the conclusion of the Mid-year Bulletin on industrial and economic conditions in the United States just issued by the National Industrial Conference Board. The board points out that although production and distribution during the first six months of this year have been below that of the similar period last year, it should not be forgotten that the first six months of last year witnessed the height of the trade boom. The report calls attention to the fact that the index of production in basic commodities as compiled by the Federal Reserve Board for the first six months of 1924 shows an increase over the average index figures for the years 1920, 1921 and 1922. From 1920 to 1923 inclusive the average was 94; for the first six months of this year the average was 111.

"During July, 1924, a considerable betterment in sentiment has taken place," says the report, "for although production has not increased considerably, prices are firmer and inquiries in respect to orders are more numerous. Trade sources indicate that June marked the low point in business so far this year, and that the turning point has been reached. The belief that business this Fall will be good is quite general. Exports for the first six months were 7.4 per cent greater in value than for the first six months of 1923.

The researches of the board show that at the end of the first six months of 1924, the cost of living was 61.7 per cent above the cost in 1914 and that amongst the items of this cost of living, rents were 85 per cent above the level of July, 1914, in June 1924.

Disorder Threatens in Mines Of Western Kentucky

After three and one half months' strike in District 23, western Kentucky, during which period a few mines have resumed operation on a non-union basis, trouble has broken out in which a few workers have been beaten, shots have been fired into miners' homes, and miners have been threatened for failing to quit work. In one case an old lady who owned property rented to workers was threatened if she did not make them move. Not much had been heard of the condition until Gov. Fields and state military officials started an investigation in the field, and press reports started appearing about July 26 or 27 concerning trouble.

However, investigations have failed to show that there has been any real disorder, or need for calling out any state troops. Five or six observation officers of the Kentucky National Guard have made an investigation in the Providence, Ky., district, where are the mines of the West Kentucky Coal Co., and the seat of most of the trouble. That firm has been trying to operate some of its St. Bernard mines under the mutual or welfare association plan, which has proven satisfactory in the old West Kentucky Coal Co.'s mines.

Lewis Speaks at Miners' Meetings

Conditions in the field were running along quite nicely prior to the visit of John L. Lewis, national president, to the field. Lewis talked before numerous miners' meetings. At the same time many autos from Illinois and Indiana entered the field, some bearing signs reading "Herrin," probably as a threat and not as declaring that the cars were from Herrin. Miners of the Norton Coal Co. have received intimidating letters postmarked "Herrin."

Outsiders have been working hard to hold the union miners in line, and stop the desertions to non-union ranks. Much of the mine labor in western Kentucky is negro, and this type is quiet, and generally causes little trouble. However, the negro when hungry, or without money and clothing, or gasoline to operate his flivver, is not especially strong for unionism.

Around Madisonville and Earlington it is claimed things have been quiet and

Utilities More Efficient In Use of Coal

Efficiency in use of fuel by public-utility power plants has increased 33½ per cent in the last four years, according to a statement by the Department of the Interior, which shows that a ton of coal in 1919 produced 625 kw.-hr. of electricity, compared with 835 kw.-hr in 1923.

The total amount of electricity generated increased in this period from 39 billion kw.-hr. to 55.7 billion kw.-hr. The statement said water-power development apparently is not holding its own with steam power in the production of electricity, showing a decrease from 37.5 per cent of the total production in 1919 to 34.8 per cent in 1923.

New York leads in the production of electricity, Pennsylvania is second and California third.

orderly, and at Central City there has been no effort to operate, and no excuse for any rough tactics. In the Providence section it is claimed that there are about 100 miners working non-union, and over 1,000 union men on strike.

Alberta Strike Not Settled

The fourth month of the Alberta coal strike ended with July without any sign of a settlement. Efforts by the Labor Department of the Provincial Government to bring about a reconciliation between the miners and the operators have been unsuccessful. The Alberta government has no power to go further in the matter. Hon. James Murdock, Federal Minister of Labor, is expected to go West shortly and may take some action. William Sherman, president of District No. 18 U.M.W. of A., states that the miners are willing to meet the operators, on condition that there shall be no further effort to reduce the wages, but there is no indication that negotiations on this basis are likely to materialize. The loss to the miners in wages during the four months of the strike is estimated at approximately \$2,000,000.

Ocean Carriers Revert to Use of Coal

The wide difference between the cost of fuel oil and the cost of coal is resulting in the reconversion of many ocean carriers to the use of coal. This was one of the significant trends which Dr. George Otis Smith, the Director of the U. S. Geological Survey, observed in Europe. Dr. Smith has just returned from London where he represented the Secretary of the Interior at the World Power Conference. Another development which has much significance for coal he points out, is the progress being made in the production of a liquid fuel with coal as the base.

"A power conference held in Great Britain," declares Dr. Smith, "naturally puts emphasis on coal. As I mentioned at one of the sessions of the World Power Conference, commerce in power already is an international matter. When consideration is given to the number of wheels, throughout the world, that are turned by British coal and by American oil, there is a greater appreciation of that fact. I saw electrical energy derived from British coal and from Swedish waterfalls at work in connection with the operation of Danish farms. This example is typical of the use of power which takes on an international character.

"I saw evidence that British shipping, at least, is trending away from oil as a marine fuel because the cost of coal is relatively so much lower. The price level of fuel oil was characterized as being 'totally unwarranted.' I was told that fuel oil was selling at Mediterranean ports at 87s. 6d. (\$19.93 present exchange) per ton as against 35s. (\$7.97 present exchange) for coal. Bunker coal was obtainable at United Kingdom ports, I was advised, at 20s. (\$4.56). Some oil-burning ships already have been reconverted to coal. Apparently this is prophetic of what surely will take place more generally at some time in the future unless economic processes are developed for using coal as the source of a liquid fuel.

"It is significant that so strong an interest as The Vickers is giving attention to processes for treating coal as the raw material in the manufacture of fuel in more convenient forms."

Bituminous Coal Loaded Into Vessels at Lake Erie Ports During Season to End of July

(In Net Tons)

		1924			1923			1922		
		Cargo	Fuel	Total	Cargo	Fuel	Total	Cargo	Fuel	Total
Toledo.....	Hocking Valley.....	3,123,137	92,469	3,215,606	2,314,486	69,256	2,383,742	1,492,230	36,331	1,528,561
	Big Four**.....	1,375	46	1,421						
	N. Y. C.-Ohio Central Lines.....	27,095	1,055	28,150	817,014	25,428	842,442			
Sandusky.....	Baltimore & Ohio.....	768,400	25,778	794,178	1,233,115	36,349	1,269,464	1,649,323	40,916	1,690,239
	Pennsylvania.....	1,299,469	39,916	1,339,385	1,398,824	42,331	1,441,155	975,982	27,879	1,003,861
Huron.....	Wheeling & Lake Erie.....	365,880	17,686	383,566	718,221	26,586	744,807	7,612	334	7,946
Lorain.....	Baltimore & Ohio.....	795,192	64,967	860,159	1,511,966	86,094	1,598,060	17,820	16,069	33,889
Cleveland....	Pennsylvania.....	642,975	84,111	727,086	906,827	83,495	990,322	44,805	22,543	67,348
	Erie.....	151,289	5,618	156,907	475,844	20,649	496,493			
Fairport.....	Baltimore & Ohio.....	240,717	45,656	286,373	326,908	32,708	359,616			
Ashtabula.....	New York Central.....	467,889	55,317	523,206	1,854,363	121,693	1,976,056	31,083	15,391	46,474
	Pennsylvania.....	525,338	41,553	566,891	1,020,053	42,721	1,062,774	30,393	16,708	47,100
Conneaut.....	Bessmer & Lake Erie.....	834,364	113,034	947,398	1,394,998	98,505	1,493,503	58,139	1,207	59,346
Erie.....	Pennsylvania.....	245,541	37,645	283,186	311,596	39,842	351,438	28,607	31,148	59,755
Total.....		9,488,661	624,851	10,113,512	14,284,215	725,657	15,009,872	4,335,993	208,526	4,544,519
*1923 Storage Loading.....		182,060	4,940	187,000						

* Coal loaded into vessels in December, 1923, after close of navigation and forwarded from Lake Erie ports during 1924 season. **Lake coal into Toledo over B & O Route and dumped by Ohio Central Machine.

C. compiled by Ore & Fuel Exchange, Cleveland, Ohio.

Opening Gun in Plan to Increase the Safety of West Virginia's Mines

Open lights are doomed in the soft-coal mines of West Virginia, judging by a consensus of the opinion expressed at the safety meeting held in Fairmount, that meeting being one of a series called by the West Virginia department of mines for the purpose of obtaining suggestions as to sections to be incorporated into a new mining code for West Virginia. Mining men now are generally a unit in expressing the opinion there are no non-gaseous mines.

R. M. Lambie, chief of the West Virginia department of mines, said the open-flame lamp must be discarded. He regards that as the first precaution to be taken in guarding against serious accidents. Mr. Lambie cited several instances to show that some mines that had apparently never emitted gas had shown themselves gaseous after a slate fall. "It's not what you have, but what you might have," remarked the head of the department in summarizing the great danger which at all times was to be feared from gas in soft-coal mines.

More Speed for Bureau

Frank Haas, consulting engineer of the Consolidation Coal Co., said that some means should be used to get the U. S. Bureau of Mines to speed the process of testing and approving of machinery for use in the mines. He urged that it might be advisable for mine operators to let manufacturers of mining equipment know that approved machinery is in demand.

A practice greatly condemned by Mr. Lambie was the shooting of coal from the solid. V. G. Deahl of the Hiorra Coal Co. said that this practice was common in his field, attributing such violations to the loose practices which prevailed during the war.

Might Change Machines Over

Chief Lambie stated that although he wanted reforms in the state mining laws, it was not the desire of his department to force coal companies to put in approved equipment in the mines immediately, providing that they add safety devices to the present machinery.

E. P. McOlvin, of Clarksburg, stated that the state mining law should define the meaning of "shooting coal from the solid." Dean R. C. Jones, of the school of mines of the West Virginia University, suggested that a blank be issued by the department to be filled out whenever gas is found. He recommended that this be incorporated in the reports of the mine foreman and fireboss.

White Will Head Coal Commerce Division

C. P. White, formerly in charge of distribution for the U. S. Fuel Administrator, will head the coal division of the Department of Commerce, a position that has been vacant since the resignation of F. R. Wadleigh. This place was offered to Mr. White at that time but just then he was not in position to accept it. Secretary Hoover felt the place well might be left vacant until a properly qualified man could be found. He also was influenced by the fact that the coal division was in the capable hands of F. M. Shore, who was Mr. Wadleigh's assistant and who has been acting chief since Mr. Wadleigh's resignation. Mr. White served as an assistant to Mr. Wadleigh while the latter was Federal Fuel Distributor. At that time Mr. White was in charge of the situation at the head of the Lakes.

Old Ben Selling \$13,000,000 In Bonds and Debentures

Prominent among recent industrial financing is the issue of \$13,000,000 securities by the bankers on behalf of the Old Ben Coal Corporation. The offering will be made today of \$8,000,000 first mortgage twenty-year 6 per cent gold bonds and \$5,000,000 ten-year 7½ per cent debentures.

The \$8,000,000 issue is being offered by a syndicate consisting of the National City Company, Drexel & Co. and Cassatt & Co., at a price to yield over 6.17 per cent. The \$5,000,000 debentures are offered at 100 and interest by the National City Company and Cassatt & Co. The twenty-year bonds are secured by a first lien on all the mineral and surface lands, real estate, mine plant and equipment and other fixed assets of the corporation. For the debentures provision has been made for a semi-annual sinking fund commencing Feb. 1, 1925, sufficient to retire by lot \$250,000 par value of the debentures annually at 110.

The Old Ben Coal properties are in southern Illinois and include 56,800 acres of coal land. The average annual net earnings after depreciation and depletion, according to the bankers, are more than five times the annual interest charges on the \$8,000,000 of first mortgage bonds. Current assets are more than six and a half times current liabilities. The company is making extensive improvements.

Dock Men Counter Attack In Northwest Rate Battle

The Northwest Dock Operators Association and other dock interests on Aug. 1 filed with the I.C.C. at Washington an answer to the various petitions that have been filed against the Sept. 10 increase in rates on Illinois coal going into the Northwest. The answer appears especially to be a reply to the long attack the Illinois Coal Operators' Association made two weeks before, in which they pointed out many commission errors and appealed for a reopening of the lake dock rate cases which they had lost.

In the dock men's reply, the Chicago law firm of Butler, Lamb, Foster & Pope declares that the so-called "errors" were not errors at all, that Illinois does not show that it has any new evidence to present which would be worthy ground for a reversal of decision by the I.C.C. and that therefore, there is no reason for a reappearing of the cases. The dock answer denies that the Commission based its decision on the fact that tonnage from the docks to the Twin Cities had declined while Illinois tonnage increased. This had nothing to do with the decision. It denies that the decision is illegal simply because the changes ordered will require other readjustments under the long-and-short-haul clause. Righting one wrong is not illegal merely because it does not right all the wrongs that exist.

Answer Justifies the Commission

The answer further holds that the evidence in the case proved that the same carriers control rates from both rail and lake territories of origin, and therefore the Commission was fully justified in removing the discrimination that existed. It held that the Commission did not err in making its order apply only to certain groups and not to all Illinois groups because the original petition omitted many. It contended, also, that exclusion by the examiner of evidence with respect to origination of dock coal in the Appalachian region was not erroneous because the dock rates are local rates.

Canada Shares in Our Slump

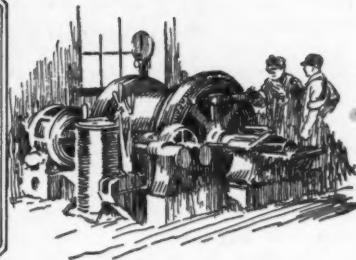
The output of coal from Canadian mines during May declined to 708,004 short tons, being a decrease of about 30 per cent below the tonnage of the previous month—and the lowest point reached since April, 1923. The falling off was due to the Alberta strike and the lessened output of Nova Scotia owing to lack of orders. Production in Nova Scotia fell from 640,000 tons in April to 430,000 tons in May. There was a marked increase in the importation of coal from the United States and Britain, May imports amounting to 1,105,126 tons, as compared with 734,991 tons in April. Exports of coal were 47,905 tons in May as against 5,318 in April. The number of men employed in the coal mines in May was 20,007, the monthly production per man being 34.3 tons as against 48 tons per man in April.

August Circular Prices for Anthracite

	Broken	Egg	Stove	Chestnut	Pea
Philadelphia & Reading.....	\$9.05	\$9.05	\$9.25	\$9.05	\$6.00
Hudson Coal Co.....	8.90	8.90	8.90	8.90	6.00
Lehigh Valley Coal Sales Co.....	8.50	8.75	9.05	9.05	5.75
Pattison & Bowns.....	8.80	8.80	9.00	8.70	5.50
D. L. & W.....	8.00	8.65	8.65	8.65	5.85
Dickson & Eddy.....	8.80	9.00	9.20	9.00	5.80
Lehigh Coal & Nav. Co.....	9.05	9.05	9.30	9.15	6.00
M. A. Hanna & Co.....	8.80	8.95	9.45	9.05	5.75
Lehigh & Wilkes-Barre.....	8.00	8.65	8.65	8.65	5.75



Practical Pointers For Electrical And Mechanical Men



Should the Positive Conductor from a Mine Generator Be Grounded?

Direction of Current Usually Presents No Serious Problem—Standard Practices Should Be Followed to Simplify Conditions—Uniformity of Connections Reduces Hazards

A MUCH debated question at a certain mine in our neighborhood is whether it is safer and more efficient to transmit direct current from the power station into the mine and to various other points in and around the plant with the trolley wire connected to the positive or to the negative lead of the generator.

Let me outline the conditions at a plant to which I refer. Power is generated by a compound-wound direct-current generator at 250 volts. The current is led from the positive brush stud on the generator to a positive switch on the switchboard and from this board to the positive busbar. All mine tracks and other parts of the usual electric circuit were connected to the positive busbar at the switchboard. With this method of connection it is obvious that pipe lines and steel structures were being utilized as positive conductors and all feeder and trolley lines used as negative conductors.

The following questions arise as to the safety and efficiency of this system of transmission:

Question A—Does this system of transmission of an electrical current tend to create more or greater hazards to the workmen in or around the mine? Are workmen more or less likely, through grounds or other causes, to receive shocks with this system? Are the hazards of the accidental starting up of any electrical machine or device increased?

Question B—Is the fire hazard increased by this system? Are the pos-

sibilities of an explosion from coal dust or mine gas increased? Will current leakage produce more, or less, electrolysis?

Question C—Will the efficiency of the generators, motors or other electrical apparatus be impaired in any manner?

Question D—Will lightning arresters work effectively on this system?

Question E—Is the potential of the positive wire of this system at the earth's pressure, there being 250 volts pressure between the positive and the negative wires? Is the negative wire at a potential 250 volts below the earth's zero pressure?

THOMAS BRENNAN.

Bairdfield, Pa.

It is the usual practice at mine operations to connect the negative wire from the direct-current generator to the ground. The best results are usually obtained by making a direct connection to the mine track at a point as close as possible to the generator. However, so as not to depend entirely upon this connection to carry all the return current back to the generator, negative conductors are often run far into the mine.

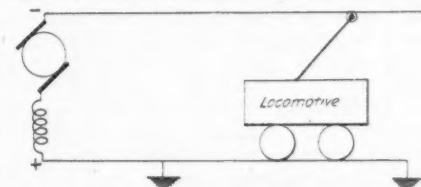
These ground connections are as important as the feeder lines, because it is necessary to keep the return circuit resistance as low as practicable so as to have good voltage at distant points in the mine. All current going through the machines used on direct-current circuits must pass through the motor windings and return to the generator. Wherever the current meets an obstruction, usually called resistance, a certain quantity of energy is lost in order to get through.

With most electrical apparatus it matters little whether the current travels in one direction or another; in fact, trolley locomotive motors are continually being reversed. The current flows in one direction continually only in those parts such as the trolley pole and sometimes the resistance, depending upon the connections used in the control wiring.

Some people have a false idea that only positive electricity does any work or can do any harm. This is not true. If the negative wire at the generator is

grounded, to stand on the ground and touch a positive trolley wire causes the current to flow downward through the body to the ground. On the other hand should the positive conductor of a circuit be grounded and the negative connected to the trolley, a person standing on the ground still gets a shock when he touches the trolley wire, but the current passing through his body travels upward through his feet.

The essential thing to remember is that current passes in one direction or



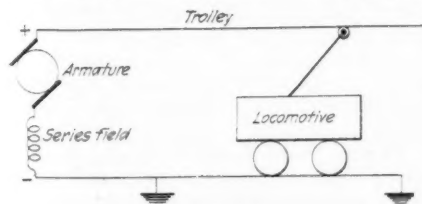
Negative Connection to Trolley

With a connection like this at one mine and the positive lead of the generator connected to the trolley at another mine it is possible to get a high potential difference between the two trolley wires at points where the systems come close together and thus create a hazard because of the high voltage.

another whenever a circuit is closed between the positive and negative leads of the generator. Unless this is done the current cannot flow. Consequently a person may handle or tread on any one of the two leads coming from the generator if he does not come in contact with the other conductor at the same time. However, such a practice is not advisable because the other conductor is not always apparent, it may be grounded or accidentally connected to some conducting material nearby and to touch this material while connected to the other wire would be equivalent to touching the other conductor direct.

The hazards due to grounding the positive wire from the generator and connecting the negative lead to the trolley are not great. As it is not the usual practice, a person working around a motor may test a certain wire and find it to be the negative lead and therefore feel quite safe in handling it, if he has been used to working in mines where the negative wire is grounded. Trolley wheels running against the trolley wires connected to the negative terminal of the generator usually sputter and throw off sparks more profusely than those running against positive trolley wires. Aside from these two hazards there are no further serious dangers.

If a negative trolley wire or feeder is given the same protection and care as a positive trolley or feeder the dangers are no greater from one than



Standard Generators and Trolley Connections

Sometimes the series-field end of the generator is made the positive terminal but connected to the trolley wire. This is done where the trolley wire is exposed to lightning in which event a lightning stroke generally breaks down the series-field winding and does not reach the armature. The series field winding is easier to repair than the armature.

the other. Accidental grounding of a negative trolley wire acts in the same way as an accidental grounding of a positive trolley; it closes the circuit on the generator. The same is true with the accidental starting of motors. The same conditions which will cause a motor connected to a positive trolley wire to start causes a motor connected to a negative trolley wire to start. The only difference is the direction in which the current flows.

The fire hazards are the same for both conditions because it usually matters little in which direction the current may be flowing. The spark is formed regardless of the direction of the current. If the voltage is high enough to create a spark, which is certainly true with a 250-volt circuit, gaseous mixtures or dust may be exploded.

However, electrolysis does depend upon the direction in which the current travels. Currents passing between two electrodes carry the metal of one over to the other. By reversing the direction of the current the metal which is the harder to break down may be carried away and in consequence the electrolytic action may actually be reduced. However in most mining work the seriousness of electrolysis asserts itself in connection with pipe joints and usually the damage done would be about the same regardless of the direction the current may be flowing through the pipes.

The efficiency of the generators or motors is not changed by reversing the flow of current. Many generators and most motors are designed to operate in either direction, and the reversal is

accomplished by changing the direction of the current in some part of the winding.

Lightning arresters are installed for the purpose of draining conductors of any abnormal voltages, and they will discharge just as soon as the potential difference between the two ends of the arrester increases to a sufficiently high value. The action of an arrester connected to a negative trolley wire is the same as with a positive trolley wire; it merely drains off to the earth any abnormal voltage on the conductor.

Any conductor directly connected to the earth takes its potential, because it then becomes part of what we call "ground." Pressures may be above or below the potential of the earth. Ordinarily the pressure at the earth is considered as zero. It does not usually matter much whether a potential is higher or lower than zero, the important fact is the volume of the difference of pressure between objects. As the pressure in the negative conductor of a 250-volt circuit is 250 volts below that in the positive wire, if the positive wire is grounded, the negative conductor has a potential difference of 250 volts between it and ground. In this case the voltage will have a negative value with respect to the earth.

These answers to the foregoing questions deal with the subject in a general way. Under certain peculiar conditions one system of generator connection is better than another, but usually it will be found best to connect the positive lead of the generator to the trolley and thus conform to the recognized practice.

than the other, consequently the weaker side stretched most, and as a result the belt began operating imperfectly. When this happens the belt should be taken off and the imperfection carefully removed. Unless this is done it is obvious that there will always be some side slip or side pull and the life of the belt will be materially reduced. It pays to watch new belts carefully and see that they get a proper start in life.

It is impossible, of course, to answer the above question completely and with absolute accuracy, but the writer feels that his reply is at least more definite and more satisfactory than the reply given by the dealer.

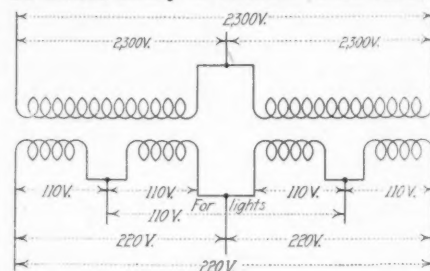
W. F. SCHAPHORST.

Taking Taps Off Transformer For Lighting

At one of our transformer banks, consisting of two 25-kva. single-phase transformers connected in open delta, we desire to take off taps for supplying a lighting circuit. It has been proposed to connect the lighting circuit to use one half of each transformer winding. Will this connection work and give satisfactory voltage for 220-volt motors at the same time? The accompanying sketch shows the transformer connections.

St. Charles, Ky. C. E. ANTHONY,
Dempster Coal Co.

Two transformers connected in open delta cannot be loaded so as to carry a load equal to the arithmetical sum of their individual capacities. For example, two 25-kva. transformers may be loaded safely to 44 kva. Care should



Open-Delta Connected Units Supplying Lights

With this connection the transformers are arranged to supply 220-volt energy to a motor circuit and 110-volt energy for lights. Care should be taken when using this connection because the individual transformer windings are not uniformly loaded and may cause local heating.

therefore be used when transformers are connected in this manner.

A discussion of this subject was given in the July 10 issue of *Coal Age*. Here O. E. Kenworthy explains in detail the operation of the transformers.

The voltages supplied by two single-phase transformers connected in open delta will be balanced but care should be taken when using parts of the transformer windings for other loads. If the circuit shown in the illustration is used for lights the loads in the transformers are unbalanced and one section of a transformer winding will be working under a heavier load than the other. This may cause local heating, which depends upon the particular design of the windings.

What Kind of Belt Should Serve My Purpose Best?

A belt user recently wrote to a dealer in belts and asked: "What kind of belt is the most economical in the long run?" The dealer replied: "The belt that will transmit the most power per square foot of its area during its natural length of service is most economical."

This answer may be correct. In fact, it is correct. But, now that the belt user has the answer what is he going to do with it? The answer is certainly a vague one. Very likely the user knew that much about it before he asked the question. What the user wants to know is, What kind of belt is the most economical in the long run—leather, cotton, rubber, camel hair, balata, etc.?

In spite of all the substitutes that have been manufactured, leather belting is still quite popular. It is the superior belting for general machine-shop work. Where belts must be shifted from pulley to pulley there is nothing better. In fact where finger shifters are employed nothing but leather belts should ever be permitted. Leather belts are also superior for use on quarter-turn drives, reversing drives, or wherever there is constant side pull, slipping, jerking, etc.

The cotton belt to a great extent has replaced the leather belt for power transmission on machines used out in the weather. Likewise it has replaced the leather belt in industries where

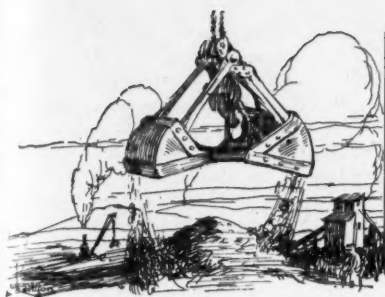
much dirt and grit is encountered as in cement mills, brick plants, flour mills, or crushing plants. It is an excellent belt for use in hot and dry places. It is strong and durable, but must never be used in connection with finger shifters because such shifters wear the edges rapidly, causing them to fray.

There are a number of rubber composition belts on the market, and it is claimed by many users that these are superior to leather belts. It is my belief that the rubber belt is superior to the leather belt for use in wet or damp places. In fact, it has practically replaced the leather belt in all such places. Like the cotton belt, however, it must never be used in connection with finger shifters because it has a fabric core which will cause failure if the edges are once worn or frayed.

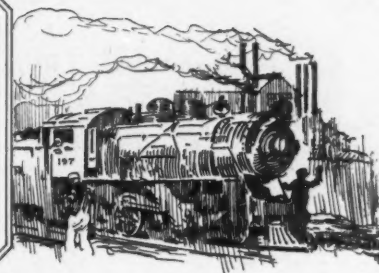
The life of a belt depends largely upon the start it gets, in the same way that the success or failure of a man depends largely upon the care given him during his childhood. Therefore, when putting a new belt on the pulley too much care cannot be given to it to see that it is put on correctly.

Shafts and pulley should be aligned as perfectly as possible so that there will be no side slipping, no forcing, no running off and no side pull.

Occasionally there is something inherently wrong in the belt itself so that after a few days of operation it will run crooked in spite of the care first given it. This may be due to the fact that one side of the belt was stronger



Production And the Market



Bituminous Coal Market Feeble but Reviving Anthracite Trade Slow and Weakening

If the revival of the coal trade does not come soon it won't be for lack of prophets and heralds. From reports one would think the bituminous-coal producer was anxious for a revival of his industry, but the truth is that the coal men are divided in sentiment. They don't like the present slackness. Who would? But they also realize that the longer it lasts the surer will be their reward at the end. If the market were to briskeen now, the volume of business would increase, but it would not be profitable business. If it waits a few months more it will have not only volume but profit, not only current strength but voltage also. However, to have to wait is vexatious and it looks now, despite the Geological Survey's report as of August 2, as if a gentle increase in production will soon be on its way. Everyone forecasts either that or a wild market, and in a few places here and there a little improvement in the coal trade is manifest. The big fall trade, and the winter anxiety about fuel which has been prophesied will hardly come, unless someone whose opinion is recognized starts something and the public in a panic does the rest. It is more likely we shall see volume rather than profit. The public has so strong a hold on the situation that the coal man has to admit that the industry "functions badly" as far as his profits are concerned. However, if the indications of increased business—and there are but few of them—are illusory and the public continues to wait, the awakening may not be pleasant.

It is useless to consider the markets separately for they conform too closely to type. Something might be said as to the Great Lakes. There only a certain dock-age space is available and the unwillingness of the retailer to buy has cluttered the docks with coal. The Northwest does not have as much time as the rest of the country to satisfy its wants, so it would do well to get coal moving.

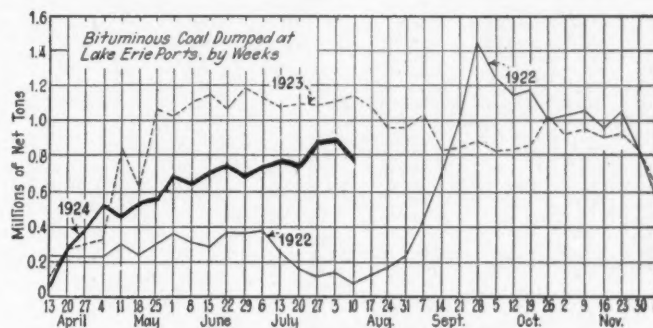
Coal Age Index of spot prices of bituminous coal

showed no change during the past week, standing on Aug. 11 at 163, the corresponding price being \$1.98.

Hampton Roads dumpings for all accounts during the week ended Aug. 7 totalled 358,916 net tons, a decrease of 3,084 tons from the week preceeding.

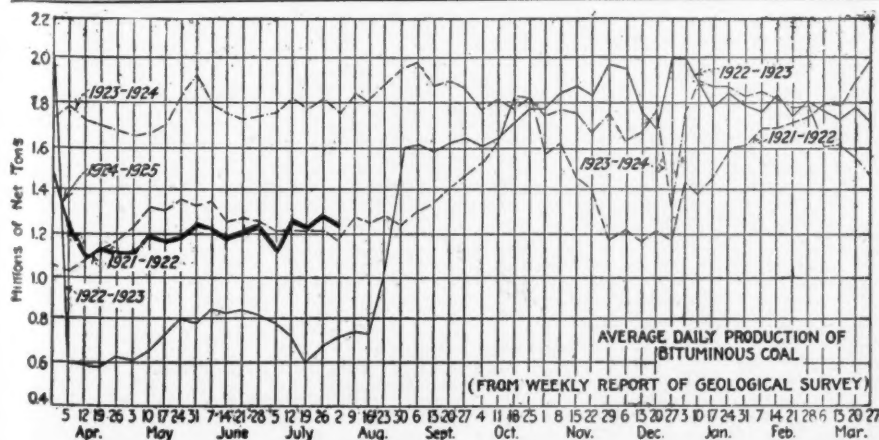
The movement of coal at the Lakes made a marked decline, being for the week ended Aug. 10, according to the Ore and Coal Exchange: For cargo 725,168 net tons and for fuel 47,054 net tons, as against totals of 830,915 and 44,066 net tons respectively the week before.

The production of bituminous coal for the week ending Aug. 2 decreased slightly, the output according to



the Geological Survey totalling 7,486,000 net tons. The previous week showed an output of 7,542,000 tons, according to the revised figures. Anthracite production decreased, being 1,720,000 net tons in the week ending Aug. 2 and 1,837,000 tons in the previous week.

The anthracite and bituminous coal markets, strange to say, are in a similar condition. Both are feeble, but whereas the anthracite sales are few but declining, the bituminous sales are few but increasing. Canada is still a weak market for anthracite. Winnipeg seems to be responding to the active efforts of the Alberta producers who are supplanting those of Pennsylvania.



Estimates of Production

(Net Tons)			
BITUMINOUS			
		1923	1924
July 19.....	10,676,000		7,401,000
July 26.....	10,817,000		(a) 7,542,000
Aug. 2.....	10,564,000		(b) 7,486,000
Daily average.....	1,761,000		1,248,000
Cal. yr. to date (c).....	322,535,000		261,885,000
Daily average to date.....	1,772,000		1,440,000
ANTHRACITE			
July 19.....	2,005,000		1,840,000
July 26.....	2,080,000		1,837,000
Aug. 2.....	2,018,000		1,720,000
Cal. yr. to date.....	60,834,000		54,189,000
COKE			
July 26.....	363,000		99,000
Aug. 2.....	345,000		(a) 94,000
Cal. yr. to date.....	11,814,000		6,578,000

(a) Revised from last report. (b) Subject to revision. (c) Minus one day's production to equalize number of days in the two years.

Midwest Sells Little for Storage

The midwest shows a little activity in a small way in the higher-grade coal for storage purposes, but nothing doing in anthracite, smokeless or coke. Medium Illinois coals are slow.

The warm weather during the past week is largely accountable for stopping of domestic orders. With no apparent increase in price the public is indifferent yet as to any great movement of storage. Wagon-load steam is at a standstill and carload steam is easy and not noticeable.

There is practically nothing doing in Southern Illinois although a little coal moves occasionally, but the tonnage seems to be dropping off except in spots. There is no great movement of any one particular size in the Carterville field. All mines have unbilled coal of all sizes, including steam. Railroad tonnage is light. Mines get from one to three days a week. The strip mines still continue to show good working time.

The Duquoin field is near at a standstill and the Mt. Olive district is about as quiet as it can be. A little railroad coal is moving out of this district and some small tonnage on contracts.

The Standard coal field is tied up with no-bill coal of all sizes. Screenings continue to go down, and the domestic sizes show no increase, excepting in 6-in. lump, which has moved up 15c. this week. Every kind of coal is lagging in a disheartening way. Railroad tonnage is off.

Chicago had a keen disappointment last week as business showed a notable slump. It is thought that previous activity was due to optimistic newspaper reports of farmer prosperity and a booming stock market. Evidently the coal market is to be left behind in the new prosperity.

Kentucky Still Hopeful

Somewhat better demand for fuel is reported in the Louisville market. Domestic sizes are moving better, as the public is beginning to think about winter supplies, and better agricultural and general business conditions are resulting in more confidence, especially among wage earners. Retail prices have been firm since the April reductions, and it is generally understood that the market can move only in one direction and that is upward. Retailers are still slow in stocking, from fear of summer slacking, heating, etc., and because collections have been slow, and they do

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern		Market Quoted	Aug. 13 1923	July 28 1924	Aug. 4 1924	Aug. 11 1924†	Midwest		Market Quoted	Aug. 13 1923	July 28 1924	Aug. 4 1924	Aug. 11 1924†
Smokeless lump.....	Columbus....	\$5.85	\$3.85	\$3.60	\$3.50@	\$3.75	Franklin, Ill. lump.....	Chicago.....	\$3.90	\$2.85	\$2.85	\$2.75@	\$3.00
Smokeless mine run.....	Columbus....	3.00	2.10	2.10	2.00@	2.25	Franklin, Ill. mine run.....	Chicago.....	2.85	2.35	2.35	2.25@	2.50
Smokeless screenings.....	Columbus....	2.35	1.30	1.20	1.15@	1.30	Franklin, Ill. screenings.....	Chicago.....	1.65	1.70	1.70	1.60@	1.80
Smokeless lump.....	Chicago.....	5.75	3.85	3.85	3.75@	4.00	Central, Ill. lump.....	Chicago.....	2.60	2.50	2.50	2.50	
Smokeless mine run.....	Chicago.....	3.00	1.85	1.85	1.75@	2.00	Central, Ill. mine run.....	Chicago.....	2.10	2.10	2.10	2.00@	2.25
Smokeless lump.....	Cincinnati.....	6.00	3.85	3.75	3.75@	4.00	Central, Ill. screenings.....	Chicago.....	1.35	1.60	1.60	1.60@	1.65
Smokeless mine run.....	Cincinnati.....	2.75	1.85	1.85	1.75@	2.00	Ind. 4th Vein lump.....	Chicago.....	3.35	2.60	2.60	2.50@	2.75
Smokeless screenings.....	Cincinnati.....	2.85	1.35	1.30	1.15@	1.50	Ind. 4th Vein mine run.....	Chicago.....	2.60	2.35	2.35	2.25@	2.50
*Smokeless mine run.....	Boston.....	5.60	4.30	4.30	4.10@	4.30	Ind. 4th Vein screenings.....	Chicago.....	1.60	1.70	1.70	1.60@	1.80
Clearfield mine run.....	Boston.....	2.35	1.85	1.90	1.45@	2.35	Ind. 5th Vein lump.....	Chicago.....	2.85	2.35	2.35	2.25@	2.50
Cambria mine run.....	Boston.....	2.85	2.30	2.30	2.00@	2.50	Ind. 5th Vein mine run.....	Chicago.....	2.10	2.10	2.10	2.00@	2.25
Somerset mine run.....	Boston.....	2.60	2.00	2.05	1.75@	2.40	Ind. 5th Vein screenings.....	Chicago.....	1.45	1.55	1.55	1.50@	1.65
Pool 1 (Navy Standard).....	New York.....	3.25	2.70	2.70	2.55@	2.55	Mt. Olive lump.....	St. Louis.....	3.00	2.85	2.85	2.75@	3.00
Pool 1 (Navy Standard).....	Philadelphia.....	3.45	2.80	2.80	2.60@	3.00	Mt. Olive mine run.....	St. Louis.....	2.00	2.50	2.50	2.50	
Pool 1 (Navy Standard).....	Baltimore.....						Mt. Olive screenings.....	St. Louis.....	1.50	2.00	2.00	2.00	
Pool 9 (Super. Low Vol.).....	New York.....	2.45	2.05	2.05	1.90@	2.25	Standard lump.....	St. Louis.....	2.40	2.15	2.15	2.00@	2.35
Pool 9 (Super. Low Vol.).....	Philadelphia.....	2.75	2.15	2.15	1.95@	2.35	Standard mine run.....	St. Louis.....	1.85	1.80	1.80	1.75@	1.85
Pool 9 (Super. Low Vol.).....	Baltimore.....	2.50	1.95	1.95	1.90@	2.00	Standard screenings.....	St. Louis.....	1.05	1.45	1.20	1.15@	1.25
Pool 10 (H.Gr. Low Vol.).....	New York.....	2.25	1.80	1.80	1.90@	2.00	West Ky. lump.....	Louisville.....	2.30	2.10	2.10	2.00@	2.25
Pool 10 (H.Gr. Low Vol.).....	Philadelphia.....	2.30	1.75	1.75	1.65@	1.90	West Ky. mine run.....	Louisville.....	1.65	1.60	1.55	1.40@	1.85
Pool 10 (H.Gr. Low Vol.).....	Baltimore.....	2.25	1.70	1.70	1.65@	1.75	West Ky. screenings.....	Louisville.....	1.05	1.15	1.15	1.10@	1.25
Pool 11 (Low Vol.).....	New York.....	1.80	1.55	1.50	1.50@	1.75	West Ky. lump.....	Chicago.....	2.10	2.05	2.05	1.90@	2.25
Pool 11 (Low Vol.).....	Philadelphia.....	1.96	1.45	1.45	1.35@	1.60	West Ky. mine run.....	Chicago.....	1.30	1.60	1.60	1.50@	1.75
Pool 11 (Low Vol.).....	Baltimore.....	2.05	1.55	1.55	1.50@	1.60							
High-Volatile, Eastern							South and Southwest						
Pool 54-64 (Gas and St.).....	New York.....	1.75	1.50	1.50	1.35@	1.65	Big Seam lump.....	Birmingham.....	3.50	3.20	3.40	3.30@	3.50
Pool 54-64 (Gas and St.).....	Philadelphia.....	1.85	1.50	1.50	1.40@	1.60	Big Seam mine run.....	Birmingham.....	2.00	1.75	1.75	1.50@	2.00
Pool 54-64 (Gas and St.).....	Baltimore.....	1.75	1.45	1.45	1.40@	1.50	Big Seam (washed).....	Birmingham.....	2.35	2.00	2.00	1.75@	2.25
Pittsburgh se'd gas.....	Pittsburgh.....	2.65	2.40	2.40	2.30@	2.50	S. E. Ky. lump.....	Chicago.....	3.10	2.10	2.10	2.00@	2.25
Pittsburgh gas mine run.....	Pittsburgh.....		2.10	2.10	2.00@	2.25	S. E. Ky. mine run.....	Chicago.....	1.80	1.50	1.50	1.25@	1.75
Pittsburgh mine run (St.).....	Pittsburgh.....	2.05	1.85	1.85	1.75@	2.00	S. E. Ky. lump.....	Louisville.....	2.85	2.10	2.10	2.00@	2.25
Pittsburgh slack (Gas).....	Pittsburgh.....	1.55	1.20	1.30	1.25@	1.40	S. E. Ky. mine run.....	Louisville.....	1.75	1.55	1.55	1.35@	1.75
Kanawha lump.....	Columbus.....	3.00	2.10	2.10	2.00@	2.25	S. E. Ky. screenings.....	Louisville.....	1.00	.95	.95	.85@	1.10
Kanawha mine run.....	Columbus.....	1.85	1.45	1.45	1.30@	1.55	S. E. Ky. lump.....	Cincinnati.....	3.10	2.25	2.35	2.25@	2.50
Kanawha screenings.....	Columbus.....	1.05	1.10	1.05	1.00@	1.15	S. E. Ky. mine run.....	Cincinnati.....	1.60	1.50	1.45	1.25@	1.65
W. Va. lump.....	Cincinnati.....	3.00	2.10	2.25	2.00@	2.50	S. E. Ky. screenings.....	Cincinnati.....	1.10	.90	.90	.85@	1.10
W. Va. gas mine run.....	Cincinnati.....	1.60	1.40	1.35	1.35@	1.60	Kansas lump.....	Kansas City.....	4.00	4.50	4.50	4.50	
W. Va. steam mine run.....	Cincinnati.....	1.60	1.40	1.35	1.35@	1.60	Kansas mine run.....	Kansas City.....	3.25	3.50	3.50	3.50	
W. Va. screenings.....	Cincinnati.....	1.05	.85	.90	.75@	1.00	Kansas screenings.....	Kansas City.....	2.60	2.00	2.50	2.50	
Hooking lump.....	Columbus.....	2.75	2.45	2.45	2.25@	2.65							
Hooking mine run.....	Columbus.....	1.85	1.70	1.55	1.45@	1.65							
Hooking screenings.....	Columbus.....	1.10	1.15	1.05	1.00@	1.15							
Pitta. No. 8 lump.....	Cleveland.....	2.55	2.40	2.40	2.00@	2.85							
Pitta. No. 8 mine run.....	Cleveland.....	2.05	1.35	1.85	1.80@	1.90							
Pitta. No. 8 screenings.....	Cleveland.....	1.25	1.05	1.10	1.10@	1.30							

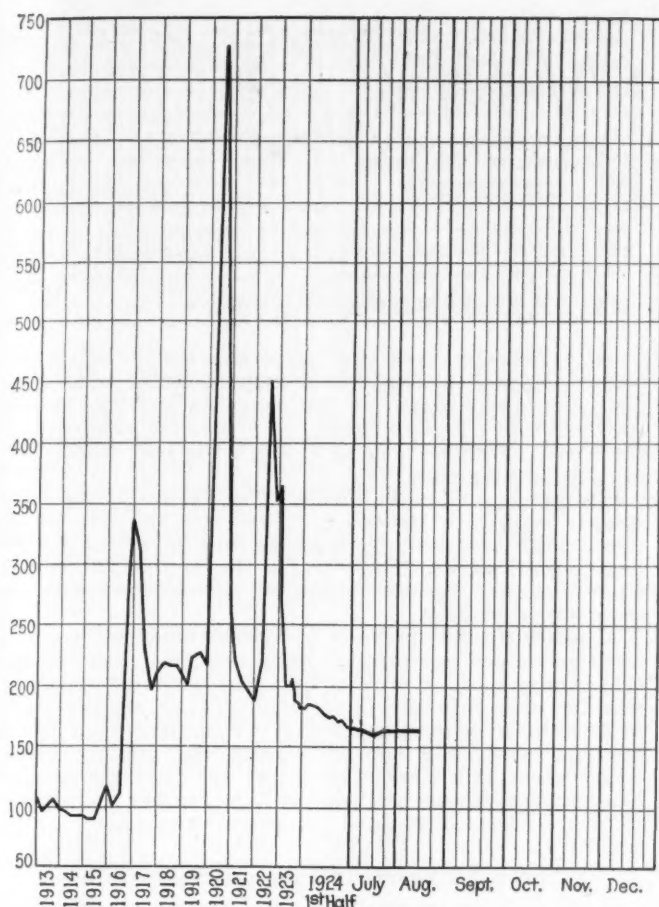
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type, declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

		Market Quoted	Freight Rates	August 13, 1923		August 4, 1924		August 11, 1924†	
				Independent	Company	Independent	Company	Independent	Company
Broken.....	New York.....		\$2.34		\$7.75@	\$8.35		\$8.00@	\$9.05
Broken.....	Philadelphia.....		2.39		7.90@	8.10		8.90@	9.05
Egg.....	New York.....		2.34	\$8.50@	\$13.00		8.65@	\$8.75	\$9.10
Egg.....	Philadelphia.....		2.39	9.25@	11.00	\$8.40@	8.65	8.65@	9.10
Egg.....	Chicago.....		5.06	8.50@	12.00	9.00@	9.70	9.00@	9.05
Stove.....	New York.....		2.34	8.50@	13.25	8.10@	8.25	8.10@	8.12
Stove.....	Philadelphia.....		2.39	9.25@	11.00	8.00@	9.25	9.25@	9.60
Stove.....	Chicago.....		5.06	8.50@	12.00	8.15@	8.35	9.05@	9.10
Chestnut.....	New York.....		2.34	8.50@	13.00	8.40@	8.60	8.40@	8.60
Chestnut.....	Philadelphia.....		2.39	9.25@	11.00	8.30@	8.55	8.25@	8.75
Chestnut.....	Chicago.....		5.06	8.50@	12.00	8.85@	9.80	8.85@	9.80
Range.....	New York.....		2.34		7.25@	7.45		8.20@	8.32
Pen.....	New York.....		2.22	6.75@	8.50		8.30		8.90
Pen.....	Philadelphia.....		2.14	7.00@	7.50	4.25@	5.25	4.50@	5.25
Pen.....	Chicago.....		4.79	7.00@	8.50	5.75@	6.25	5.75@	6.00
Buckwheat No. 1.....	New York.....		2.22	3.00@	3.50	5.15@	5.60	5.15@	5.60
Buckwheat No. 1.....	Philadelphia.....		2.14		3.50	1.75@	2.50	2.00@	2.25
Rice.....	New York.....		2.22	2.25@	2.50	2.50@	3.00	2.50@	3.00
Rice.....	Philadelphia.....		2.14		2.50	2.00@	2.25	1.70@	2.00
Barley.....	New York.....		2.22	1.25@	1.50	1.15@	1.50	2.00@	2.25
Barley.....	Philadelphia.....		2.14		1.50	1.50		1.15@	1.40
Birdseye.....	New York.....		2.22		1.50	1.50		1.50	

* Net tons, f.o.b. mines. † Advances over previous week shown in heavy type, declines in italics.



Coal Age Index of Spot Prices of Bituminous Coal F.O.B. Mines

	1924			1923
	Aug. 11	Aug. 4	July 28	Aug. 13
Index	163	163	163	196
Weighted average price	\$1.98	\$1.98	\$1.98	\$2.37

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States, weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913-1918," published by the Geological Survey and the War Industries Board.

not want to tie up capital in stock. A lot of retailers are unable to see anything in sight that can force the market up.

Slightly firmer prices on 6-in. block coal and improved demand for prepared sizes marked the week in Western Kentucky. Some operators are now quoting a low of \$2.25 on block, and as high as \$2.50, as against a market of \$2.15@2.35 a week ago, although some block can probably be had at right around \$2. Egg, lump and nut prices are unchanged. Illinois Central R.R. mines favored by railroad buying, and fair movement of mine run, have been asking as much as \$1.85 for good qualities, but some strip pit coal, and off-grade stuff in the field can be had at \$1.40 and probably less.

Northwest Has One Bright Spot

Everything is better at Duluth than at last writing, with trade brightening, more shipments going out from the docks and prices firmer. There has been no change in prices during the past week, but it is expected by the dock men that an increase will take place within a short time in bituminous coal if trade continues active.

The Twin Cities are awaiting the harvesting of the crop before purchasing anything. Both consumers and dealers have thus far bought much less coal than they should.

Dock receipts have been much less than a year ago, but the dock men carried over so much coal that they have about as much on hand as they had a year ago. They do not want any excessive tonnage and hope producers will not load them excessively.

August weather is not conducive to coal buying, never-

theless Milwaukee dealers say there is a slight improvement in the demand. The demand is bound to increase, now that the fall months are approaching. A general revision of prices of soft coal is anticipated Sept. 1, in addition to the final increase of 10c. per ton on anthracite. Cargo receipts to date aggregate 405,438 tons of anthracite, and 1,022,088 tons of soft coal.

Southwest Made Stumbling Start

A few weeks ago Southwestern operators, encouraged by a steadily strengthening demand, thought they saw an early fall market. Since, the market has weakened until in the early days of August less business was done than in the same period of June. Some operators, who had announced their intention to advance their quotations on Arkansas semi-anthracite Aug. 1, were deterred by the decline. Schools have begun to store for winter and there still is a light demand for threshing, but, with the exception of the normal industrial contract market, this is the extent of demand. Henryetta, Okla., coal is \$4.50 for lump, \$4 for nut, \$3.75 for mine run and \$2 for screenings. Arkansas semi-anthracite is quoted from \$5.50 to \$7 for lump, \$3.50 to \$4 for mine run and \$2 for screenings.

In Colorado the sales of domestic coal improved a little last week. Storage orders are beginning to come in but only slowly. Although conditions are far from encouraging and normal, operators are fairly optimistic for they are expecting to have a busy month. Mines worked on an average of twenty hours with 49 per cent of the working time lost attributed to lack of market.

Cincinnati Better but Doesn't Know It

In Cincinnati the trade spirit has sunk to the lowest ebb in years, the weather probably being the cause. The buyers' market still continues with scarcely an item in the whole list being actively sold. Yet production has shown an upward trend. The figures of J. A. Morris, in charge of car interchange for the West Virginia-Kentucky coal section under the American Railway Association, shows 9,849 loaded cars passed north at the gateways under his jurisdiction, an increase of 402 cars over the previous week. Lake movement is still low, the number of cars due there being 21 less than during the preceding week.

Run-of-mine prices have stiffened again. Buyers find that \$1.40 is about the lowest price at which good coal can be obtained. Some steam stuff is still obtainable around \$1.25, the malleables and byproduct coals run higher, some quotations being as high as \$1.65-\$1.75. Domestic business is "shot" and the slack turnover is about grooved at 75c.-\$1.10.

In smokeless there is little disposition on the part of the standard Pocahontas producers to slice the price named by the circular. Some New River prepared in lump and egg can be had around \$3.75, though seemingly there is an absence of the \$3.50 coal that could be had last week. The screenings are draggy, the asked price running \$1.25-\$1.50, and where large tonnages are involved the price is shaded. Specialized coals are selling: Egg \$2-\$2.60; lump \$3-\$3.50.

In a retail way there was a fairly healthy swing into August, with prices lined up this way: Pocahontas lump \$8, run of mine \$5.50-\$6, bituminous lump \$6.25-\$6.50, slack \$3.50-\$5.50.

Better feeling is developing in Columbus and central Ohio territory. Buying of domestic sizes has increased slightly and producers as well as jobbers believe that a much stronger demand will soon come from retailers. Retail prices are fairly steady at the levels which have prevailed for some time.

Steam trade is still dull and there are no indications of improvement. Railroad requisitions are not especially large. Iron and steel plants are only buying what is needed and there is no general movement to stock up. Utilities are the best customers. School coal is moving in large quantities and municipalities are also placing orders.

A seemingly stronger demand for slack and screenings has stiffened the spot prices of these grades in eastern Ohio from 5 to 20c. per ton. Less slack is available for the Lake shipping from No. 8 field has demanded less lump than usual and consequently the mines did not produce the slack. The market for Lake cargo coal is very quiet.

In other ways also, the general tone in the coal trade is better, but appreciable improvement is, of course, being

retarded by the general depression. During the week ended Aug. 2, the No. 8 field of eastern Ohio produced 266,000 tons, or about 38 per cent of the estimated capacity of the field for the week. This was 11,000 tons under the output of the preceding week and 161,000 tons under the corresponding week of last year.

The Geological Survey reports continue to show increased shipments of coal from the general Pittsburgh district, say a 30 per cent operation against about 20 per cent in April and May. The trading market in coal does not reflect any such increased activity, though it is now probably a little less dull than in April. Such increases as there have been in shipments probably have been due chiefly to heavier movement between operators and regular customers, those who ordinarily have contracts for the coal year, but now simply take shipments as they need them and adjust the price periodically.

The bituminous coal trade in Buffalo is quieter than ever. Only the slow condition of other branches of trade keeps some dealers from giving up their coal business altogether. They are beginning to fear the old bituminous-coal market in Buffalo is weakened forever, the non-union fields ousting the union and going to the consumer by other routes.

New England Prices Stiffening

The bituminous situation in New England has improved a little during the past week. Actual purchases have not been any larger—in fact total sales are probably slightly less owing to decreased activity due to hot weather—but the sentiment is better. Many consumers, some of them large, have announced that they must come into the market shortly.

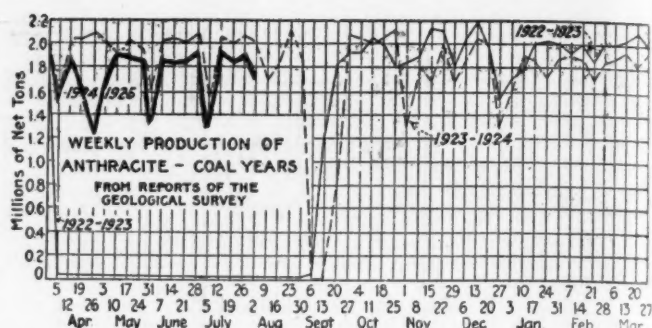
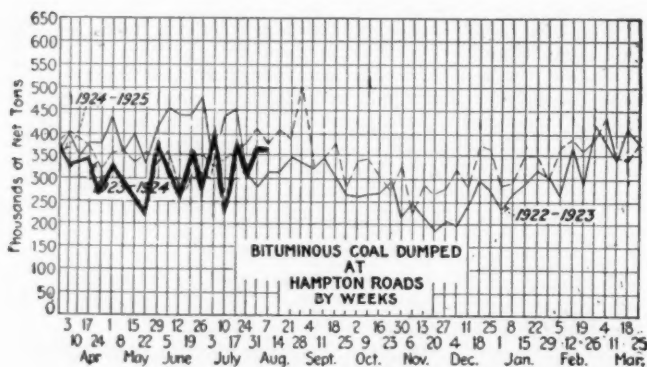
Prices have assumed a healthier tendency during the last day or two. Offerings of good low-volatile smokeless are less frequent at \$5.40 gross ton on cars, Boston, the going figure last week. Where this price was acceptable a week ago \$5.45 is now the bottom, and certain shippers here who sell on a guaranteed analysis hold firmly for \$5.50 on cars whether one car or a dozen is ordered. This firmer tendency follows news of a decline in tonnage at southern loading ports which is expected to be reflected shortly in spot f.o.b. prices.

The industrial situation has taken a turn for the better. Shoe factories and textile mills have greatly increased their running time. Water is low, and coal must be used for steam making. Pennsylvania still finds a narrow market, due to the margin in favor of landed tidewater coal prices. Coal has been shipped from Boston to a fairly northern Vermont point that is normally all-rail territory, at a landed cost over 25c. per ton lower than that of a like quality Pennsylvania coal. Sales of Pennsylvania coal are largely confined to retailers and consumers who desire lumpier coal than New River.

Atlantic Seaboard Situation Improving

In the New York bituminous market many wholesalers report improvement. More inquiries are reported and a greater demand for tonnage, though, of course, a number of unfavorable factors continue and certain unethical practices are uncovered from time to time, such as operators quoting lower prices to consumers than to wholesalers which, of course, makes an unfavorable impression on those who have so often borne a burden on behalf of the operating interests. There is as yet no change of consequence in prices and little is anticipated in the near future.

At Philadelphia the soft-coal trade is as inactive as last



week, but the iron and steel trade shows signs of distinct betterment, with some plants already operating on a larger scale and others preparing for increased activity. As yet the buyers for these concerns are proceeding cautiously in their coal purchases and as a result the coal market has not felt any impetus.

Business is dull in Baltimore. The failure of the early August market to strengthen is reflected in price quotations, which are about the same as they have been for the past several weeks. Exports for the first eight days of August show a decided falling off as compared with the same period of July.

A better feeling prevails in the Birmingham trade, a more active demand for coal being exhibited than for several months past. Contracts have been made by consumers who for some time have been supplied from the spot market. A little more spot business was booked than in the previous week, and bunker demand was slightly better. Small towns and community centers are placing orders for domestic coal in one- and two-car lots. Further wage reductions are reported at some commercial and domestic operations.

Some Anthracite Mines on Short Time

In New York traders in anthracite feel much encouraged by the increased number of inquiries of the past week. So confident is the belief in approaching better conditions that middle-houses are limiting their commitments, not caring to have too much business booked at present prices.

Stove coal continues strong, and egg, as usual, is in second place as regards demand, nevertheless it is holding up remarkably well. Chestnut moves sluggishly, but the revival in the western trade is expected to cure this. Buckwheat and rice are in a somewhat better condition. Barley also has been moving well considering the low price of bituminous coal with which it has to contend.

The demand for anthracite in Philadelphia is so light that some operators last week put their mines on a four-day schedule. This plan will be followed in the coming week. In consequence no large-sized coal will be stored by the producer for winter demand. The only size the retailers want is stove, and they are content to wait till it comes. A small tonnage of nut and pea are sold occasionally at reduced prices with \$8.75 and \$5.25 as their respective prices. Steam coals are rapidly accumulating. The independents are known to be moving some of their surplus buckwheat at \$2 to \$2.25 with proportional cuts on rice, although barley is not so difficult to sell.

Despite the effort to get their customers to buy by prophecies that coal will advance at retail 25c. per ton on the first of September, Baltimore retailers are finding trade extremely light. In New England the retail anthracite demand shows further contraction and the wholesale market is dull with marked irregularity in independent prices.

The Buffalo anthracite trade is slow. Anthracite which gained when the natural-gas flow began to subside is losing business now to the gas from big byproduct ovens.

The Connellsville coke market continues dull. The decrease in blast-furnace activity practically ended several weeks ago, and coke production has lately been closely adjusted to requirements, so that there is neither distress coke seeking sale nor consumers seeking extra tonnages. The furnace coke market has been quotable at \$3 for several weeks. Foundry coke remains at \$4 to \$4.50, to which it recently declined. Demand if anything is a shade lighter than a fortnight ago. Heating coke remains quotable at around \$2.60 to \$2.75, with good medium sulphur coke, for non-ferrous use, at say \$2.75 to \$2.85.

Foreign Market And Export News

Coal Trade in Great Britain More Depressed than Ever

The Welsh steam coal market is inactive and depressed, and, though a number of pits have been closed down, production is still ahead of demand. With few exceptions the collieries are accumulating stocks, and notices to terminate contracts have been given at several collieries affecting about 6,000 miners. The threat of the Miners' Federation to strike in the Rhondda No. 1 District on the non-unionist question appears to have been effective, as nearly every non-unionist has been brought in.

Business all round is poor, and prices show a tendency to decline still further. European business is well below the average, France and Italy taking very little coal of any sort. Only occasional orders come from Belgium and Germany.

The Newcastle market is also depressed, inquiry is slow and small in volume, and many of the pits are finding it difficult to keep going steadily. The industrial demand is at a low ebb, though operators are hoping for a revival in gas coal contracts on account of storage for the winter. The Palermo gasworks have contracted for the supply of about 12,000 tons of gas coals for delivery during August and September.

Production by British collieries during the week ended July 26, according to a cable to *Coal Age*, totalled 4,489,000 tons, compared with 4,904,000 during the week ended July 19.

France Has Shortage of Domestic Coal

Industrial coals are inactive with increasing tonnages offered. On the other hand there is a shortage of domestic coal and consequently a market favorable to the coal operator. The coal companies are behind with their orders and in cases were shipping coal in the end of July that they should have forwarded in May. In British

coals, transactions are relatively slow. It is reported that large French purchasers have recently been concluding contracts for British coals with deferred

French Imports and Exports of Fuels During May and June, 1924

IMPORTS			EXPORTS		
May Metric Tons	June Metric Tons	COAL	June Metric Tons	May Metric Tons	
529,075	505,294	Sarre.....			
1,459,341	912,443	Great Britain.....			
180,041	177,428	Belgium.....			
		Luxemb.....	67,218	45,555	
64,957	22,065	United States.....			
313,907	154,621	Germany.....	10,257	6,830	
2,912	2	Spain.....	161	60	
44,340	38,462	Holland.....			
		Switzerland.....	13,027	37,177	
		Italy.....	1,273	783	
309	65	Other countries... Bunkers	11,178	8,218	
		(French s/s)	67,300	38,218	
		(Foreign s/s).....	797	5,467	
2,594,882	1,810,380		171,211	142,300	
COKE					
20,520	1,096	Great Britain.....			
	3,474	Sarre.....			
33,677	35,376	Belgium.....			
		Luxemb.....			
	29,920	Holland.....			
428,060	397,569	Germany.....			
	6,593	United States.....	5,099	5,682	
		Switzerland.....	194	304	
		Spain.....	12,043	14,729	
39,031	0	Italy.....			
		Other countries... Bunkers	14,826	13,719	
521,888	474,028		32,162	34,434	
PATENT FUEL					
15,979	11,517	Great Britain.....			
30,790	33,956	Belgium.....			
		Luxemb.....			
30,023	30,040	Germany.....			
		Switzerland.....	10,540	6,766	
307	378	Other countries... Bunkers	400	4,825	
		(French s/s)	577	703	
		(Foreign s/s).....	4	154	
77,099	75,891		11,521	12,448	

deliveries. For instance, the Midi Railway Co. has, it is said, just purchased Durham coking coals that are to be delivered early next year.

On the other hand, in French channel ports no British coal has been received by central stations for two months. No complaints have been heard this week relative to the lack of rolling stock.

From July 1 up to July 15, France and Luxembourg received from the Ruhr 206,100 tons of coal, 282,900 tons of coke and 11,300 tons of lignite briquets or a total of 500,300 metric tons. In the Ruhr the increase in the length of the working day has increased production, but sales are not responding to that increase as German coal prices in gold marks are still too high. Idle days are contemplated in the Ruhr.

Export Clearances, Week Ended Aug. 9, 1924

FROM HAMPTON ROADS		Tons
For Italy:		
Ital. Str. Tirso, for Genoa.....		7,452
Ital. Str. Adige, for Genoa.....		9,380
For Canada:		
Ital. Str. Armando, for Montreal.....		7,154
For Danish West Indies:		
Dutch Str. Peursum, for Curacao.....		2,896
For France:		
Ital. Str. Mazanillo, for Marseilles.....		5,007
For Cuba:		
Am. Sch. Mary H. Diebold, for Cienfuegos.....		2,332
Am. Sch. Lillian E. Kerr, for Santa Cruz del Sur		796
For Brazil:		
Gr. Str. Andreas, for Rio de Janeiro.....		7,853
FROM BALTIMORE		
For France		
Fr. Str. Lieut. Jean Laurent.....		8,234
For Italy:		
Ital. Str. Aster.....		8,951
For Porto Rico:		
Am. Str. Governor John Lind.....		387
FROM PHILADELPHIA		
For Cuba:		
Nor. Str. Tela, for Havana.....		
Nor. Str. Frieda, for Havana.....		

Hampton Roads Pier Situation

N. & W. Piers, Lamberts Pt.:	July 31	Aug. 6
Cars on hand.....	1,812	1,761
Tons on hand.....	107,606	105,404
Tons dumped for week.....	107,939	122,403
Tonnage waiting.....	5,000	25,000
Virginian Piers, Sewalls Pt.:		
Cars on hand.....	1,296	1,118
Tons on hand.....	90,950	80,700
Tons dumped during week.....	106,858	94,411
Tonnage waiting.....	5,111	2,250
C. & O. Piers, Newport News:		
Cars on hand.....	1,928	1,526
Tons on hand.....	77,884	80,333
Tons dumped for week.....	108,415	103,640
Tonnage waiting.....	11,330	9,20

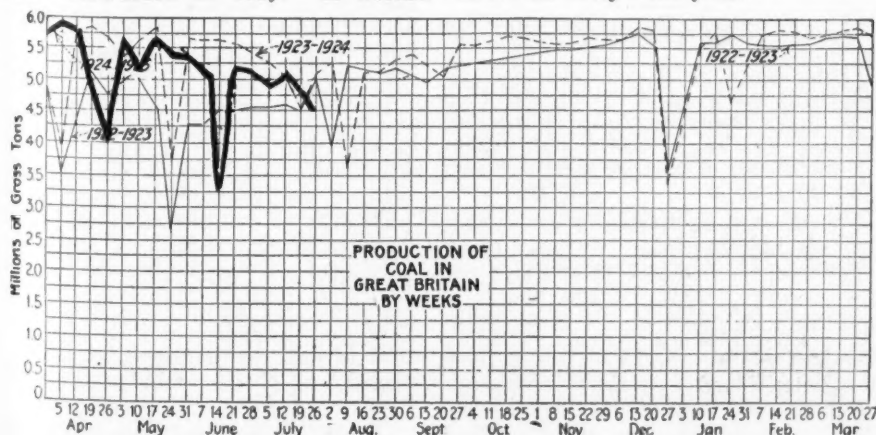
Pier and Bunker Prices, Gross Tons

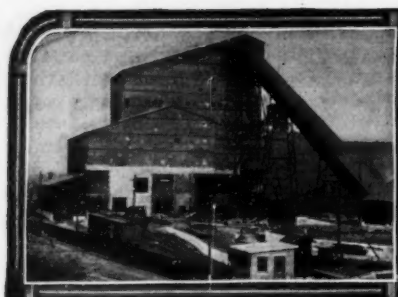
PIERS		Aug. 2	Aug. 9†
Pool 9, New York.....	\$4.75@ \$5.00	\$5.25@ \$5.40	
Pool 10, New York.....	4.50@ 4.75	4.25@ 4.60	
Pool 11, New York.....	4.25@ 4.50	4.00@ 4.15	
Pool 9, Philadelphia.....	4.70@ 5.00	4.70@ 5.00	
Pool 10, Philadelphia.....	4.45@ 4.70	4.45@ 4.70	
Pool 11, Philadelphia.....	4.30@ 4.50	4.30@ 4.50	
Pool 1, Hamp. Roads.....	4.15	4.15	
Pool 2, Hamp. Roads.....	4.05	4.05	
Pools 5-6-7 Hamp. Rds.	4.00	4.00	
BUNKERS			
Pool 9, New York.....	5.00@ 5.25	5.00@ 5.25	
Pool 10, New York.....	4.75@ 5.00	4.75@ 5.00	
Pool 11, New York.....	4.50@ 4.75	4.50@ 4.75	
Pool 9, Philadelphia.....	5.00@ 5.30	5.00@ 5.30	
Pool 10, Philadelphia.....	4.75@ 4.95	4.75@ 4.95	
Pool 11, Philadelphia.....	4.50@ 4.70	4.50@ 4.70	
Pool 1, Hamp. Roads.....	4.20	4.20	
Pool 2, Hamp. Roads.....	4.10	4.10	
Pools 5-6-7 Hamp. Rds.	4.00	4.00	

Current Quotations British Coal f.o.b. Port, Gross Tons

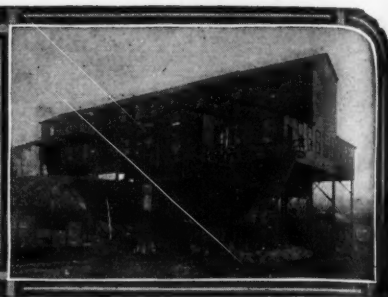
Quotations by Cable to Coal Age		Aug. 2	Aug. 9†
Admiralty, large.....	28s. @ 29s.	28s. @ 28s. 6d.	
Steam smalls.....	16s. 6d.	17s.	
Newcastle:			
Best steams.....	20s. 3d. @ 20s. 6d.	21s.	
Best gas.....	22s. 6d.	23s.	
Best bunkers.....	20s.	20s.	

† Advances over previous week shown in heavy type, declines in italics.





News Items From Field and Trade



ALABAMA

Suit for \$100,000 has been filed by C. L. Moss and G. B. McCormack, Jr., as individuals, and as Moss & McCormack against the Jagger Coal Co., John Gray and E. P. Rosamond, Jr., as damages for alleged conversion of coal.

At the sitting of the board of mine examiners held in the offices of Chief Inspector C. H. Nesbitt, July 21-24, fifty-seven applicants took the examination for certificates as first and second class mine foremen and fire boss, thirty-six of whom qualified.

A. F. Harper has been appointed superintendent-resident engineer at the Flat Top mines of the Sloss Sheffield Steel & Iron Co., succeeding J. W. Turner, who will be in charge of the mine operations for the State at this operation, which is worked by convicts under lease by the State.

The Newcastle Coal Co. has leased a number of its idle beehive ovens at Newcastle to the Black Creek Coal & Coke Co., which will use these ovens in coking coal from its Thermal mines now being developed a short distance from Newcastle. The Black Creek Coal & Coke Co. is building a large coal washery and installing other modern equipment for the mining and preparation of coal at its new operation and it is understood contemplates building of byproduct ovens in the future. The Newcastle Coal Co. has 374 beehive ovens, only a portion of which is required to care for the coal taken out at Newcastle mines.

Walter Moore and associates, operating the Pratt Fuel Corp., have acquired the properties of the Jagger Coal Co., in Walker County, near Nauvoo, Ala., which consists of about 2,500 acres of coal lands, carrying the Mary Lee, Jagger and Black Creek seams of coal, developments consisting of two mines and a stripping operation, the consideration involved being reported about \$350,000 cash. With this addition to the holdings controlled by the Pratt Fuel Corporation, it is stated that an annual output of 1,000,000 tons may be acquired should market conditions warrant such a production. Head offices of the Pratt Fuel Corporation are in Birmingham.

ILLINOIS

"Educate them; make them better labor-movement men," is the idea behind a system of schooling for miners which is going into effect in Subdistrict 5 of the Illinois Mine Workers, in and around Taylorville. The

subdistrict organization has employed Tom Tippet, a well-known Middle Western writer for the Federated Press, a radical labor news service, to lay out a course in history, economics and public speaking. Classes have been organized at ten points with enrolments running up as high as 100. Tippet tours these towns conducting the classes, each of which meets once every two weeks. Later other instructors may be used. William A. Daech, subdistrict president, denies that it is a communist movement.

INDIANA

Records of the Indiana State Board of Accounts show that Cairry Littlejohn, chief mine inspector and A. C. Daly, deputy inspector of Indiana have returned to the State Treasury amounts charged in excess of payments recorded at the hotels at which they had stayed.

Approximately 600 miners returned to work in the Indiana field this week after about three months' idleness, when three of the larger mines, the Knox mine in the Bicknell field, the Newport mine in the North Clinton field, and the Submarine mine in the Terre Haute field, resumed operations.

Co-operative mining, long a problem for the United Mine Workers of America in district No. 11, has appeared again in the Jasonville-Linton field. John Hessler, district president of Indiana says: "The co-operative mining venture at the Liberty mine, south of Jasonville, sometimes called Briar Hill, and the Keystone mine at Linton have been under investigation by the district executive board for some time." The local unions at each of those mines have been advised that unless they comply with the decision of the executive board, action will be taken against the charter of the local union."

KENTUCKY

John Drew, a 15-year old boy employed in the plant of the Elkhorn Coal Co., near Kona Station, in Letcher County, Ky., was beheaded when caught in the blades of a large metal exhaust fan on Aug. 2.

A report from Harlem, Ky., on Aug. 5, stated that the Wallins Creek Collieries Co. had laid off 200 men and closed down because it was unable to obtain a reduction in the wage scale. It is alleged that the company signed up a four-year agreement on April 1, but later found that lower scales had been granted in agreements with other companies in the same district, which

was not in accordance with the terms of its agreement. It asked for a concession, and was refused.

It is reported from McRoberts, Ky., that, on July 26, a short circuit in Mine No. 210, Consolidation Coal Co., at McRoberts, caused a fire, which spread rapidly damaging much equipment before being brought under control. A slate fall broke electric wires and caused the fire.

A ten million dollar first mortgage is reported as filed in Madisonville in favor of the Bank of North America & Trust Co., Philadelphia, July 27, the mortgage being given by the West Kentucky Coal Co., and covering mining properties, mines and equipment, in Hopkins, Webster, Union and Crittenden County, and yards, etc., at Paducah, Louisville, Memphis, Nashville and elsewhere, including the mines recently purchased from the St. Bernard Mining Co.

Fred M. Sackett of the Sackett-Speed interests, Louisville, operating coal mines in both eastern and western Kentucky, the Byrne & Speed Coal Co., jobbers and retailers, and large cement, lime and quarry plants, on Aug. 2 received the Republican nomination for U. S. Senator by a majority of over 30,000. Sackett is popular, and a strong fighter for his state. He has served three terms as president of the board of trade, and was State Food Administrator during the war.

Frank D. Rash, of Earlington, Ky., former president of the St. Bernard Mining Co., and now vice-president of the West Kentucky Coal Co., was elected State Commander of the American Legion of Kentucky at the sixth annual convention at Bardstown, Ky., on July 26.

OHIO

A mine of the Essex Coal Co., in the Hocking Valley, has been down for several weeks owing to a local strike which has not yet been settled. The curtailment in the company's output was approximately 5,000 tons weekly.

Bids were received by the Board of Purchase, July 30, for delivering 19,500 tons of coal to the various Columbus city institutions. W. S. Harmon, Columbus, was granted the contract for 7,000 tons of nut, pea and slack to the waterworks department on his bid of \$1.14 f.o.b. mines. On the same figure, he will furnish 3,500 tons to the garbage disposal plant. The Jay Miller Coal Co., Columbus, will deliver 9,000 tons of nut, pea and slack to the municipal light plant on a bid of \$1.25 f.o.b. mines.

Though it is still too early to fore-

cast the effect on production in the southern Ohio field of the new wage agreement signed at Logan recently, operators in that field believe it will be of considerable benefit. One of the principal advantages is the agreement on measures which will insure the production of clean coal. Another is the adoption of the eastern Ohio scale on dead work which is now on a yardage basis instead of by day labor. The price is approximately 10c. per yard.

Owing to the dullness of the coal demand both the subsidiaries of the Hysylvania Coal Co., of Columbus, viz; the Piney Fork Coal Co., and the Panhandle Collieries Co., located in No. 8 field, have been closed down.

The Kinwood Coal Co., Columbus, operating in the Jackson field on the Pomeroy division of the Hocking Valley R.R., is making extensive improvements during a temporary shutdown. An extra man exit is being constructed between the two beds which are 18 ft. apart, and both under operation. The new opening is made in case of accident. Steps will be taken soon to install an additional fan for ventilation.

Columbus operators were advised recently that the Hocking Valley R.R. had cleared up the congestion of 5,000 loaded cars of coal on the line between Columbus and Toledo, and that the temporary embargo placed last week has been lifted. Ample boats are now being provided at Toledo to handle all coal which passes over the docks. Little Ohio coal, however, is going up the lakes at this time, but much coal is passing through Columbus from ten union mines of West Virginia and Kentucky to the docks at Toledo and Sandusky. Reports from the Northwest showed that coal is moving off the docks more slowly than usual at this season of the year.

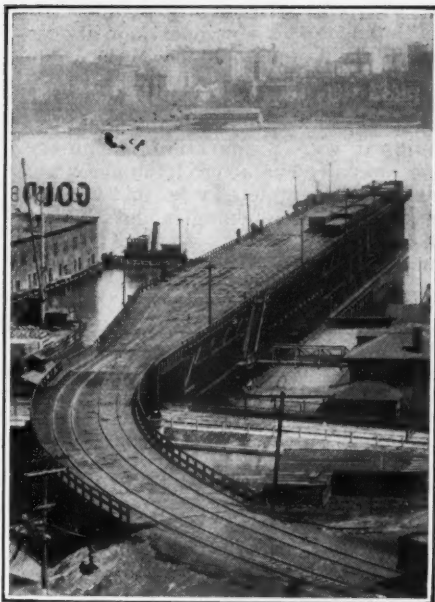
PENNSYLVANIA

The Buckeye Coal Co., a subsidiary of the Youngstown Sheet & Tube Co., is preparing to resume operations at the Nemacolin mine, in Greene County, which has been idle for a few months. The Brier Hill plant, in Fayette County, is still idle.

In front of the Lattimer offices of the North Side Coal Co., near Hazleton, is a unique war memorial to the hero dead consisting of a huge block of coal, weighing between eight and nine tons, mounted on a concrete base and with a bronze tablet on which is the inscription, "In memory of Employees of Pardee Brothers & Co., Inc., World War, 1917-1918. John W. Crooks, of Lattimer, general manager of Pardee Brothers, is the originator of the memorial.

The Lehigh Valley R.R., in addition to improving its coal-classification yards at Delano, is busy making two improvements at the Coxton yards, near Pittston, with a view to preparing for much heavier coal traffic in the future.

With the invention of a new drill, James G. Morgan, of Wilkes-Barre,



Courtesy U. S. Distributing Corp.

Coal Pocket on Hudson River

The property of the West New York Coal Co., an auxiliary of Pattison & Bowns. This is located at Weehawken, N. J.

claims to have tripled the efficiency of a blast of powder. The bit in the drill is capable of expansion after it has penetrated into the wall, the end of the hole thus being enlarged. Several mining men have examined and seen demonstration of the drill and pronounce it a forward step in mining.

The C. M. Dodson Coal Co. has started stripping operations at Beaver Brook. It is expected that coal will be reached before the winter ties up the clay work. The company has been stripping considerable areas at Beaver Brook and a large part of the anthracite output from that section is the result of daylight mining.

The tax on undeveloped anthracite lands gradually is forcing the concentration of the industry. John H. Fetting, assistant director of the legislative reference bureau, declared the tax laws are "sadly in need of revision and codification," but emphasized the fact that any revision involves a study of more than thirty special funds of the commonwealth. He pointed out that special funds are expended under a blanket appropriation and preclude proper budgeting and control of expenditures.

Forty members of local union, No. 1036, United Mine Workers of America, of Moosic, are facing suspension from the union as the result of their refusal to pay a 25c. assessment levied by the district organization upon all of the workers in the field for the relief of idle miners.

At the staff dinner of the Peabody Coal Co., Du Bois, Pa., Charles O'Neill of Altoona, secretary of the Central Pennsylvania Coal Producers' Association, said that central Pennsylvania produced 8.5 per cent of the whole output of the United States during the first six months of this year. Pennsylvania's production has dropped from 38 per cent of the output of the United States till it is now from 25 to 30 per

cent of that production, whereas West Virginia's output has increased from 6.5 per cent to 20 per cent of the whole output of the United States. The central Pennsylvania district, he said, has decreased its production from approximately 14.5 per cent in 1890 to 8.5 per cent during the first six months of 1924.

Changes in the staff of physicians who handle compensation cases in the Wilkes-Barre and Plymouth district of the Hudson Coal Co. have just been announced. Dr. Charles L. Ashley, of Plymouth has been appointed chief surgeon in the Plymouth division. He succeeds Dr. D. H. Lake, of Kingston, resigned. In the Wilkes-Barre division, Dr. Harry Smith becomes chief surgeon. He takes the place made vacant by the death of Dr. Walter Davis. Dr. Alan Corson, of Parsons and Dr. Leo Mundy, of Wilkes-Barre, are his assistants.

The new fireproof Oak Hill breaker near Minersville was recently put in operation. The old breaker was destroyed several months back. This breaker will use the Chance method of separation.

Judge R. H. Koch gave judgment in favor of William Metcusk who claimed that he was entitled to compensation both for disability and disfigurement as a result of an explosion of gas in the mines of the Philadelphia & Reading Coal & Iron Co. Judge Koch decided that the disfigurement could not be regarded as incidental to the employment.

Five men convicted in the Somerset county court early this year for dynamiting the Baltimore & Ohio R.R. bridge at Jerome Junction and released under bail are now in the Western Penitentiary in Pittsburgh serving their sentences of five to ten years.

A new mine operation near Shamokin will be started shortly on a tract of 190 acres acquired from the J. C. Langdon estate by the Shamokin Coal Co., a new organization. The new company has the following officers: T. H. Boles, New York, the vice-president and general manager of the Lehigh Valley Coal Co., president; S. D. Dimmick, vice-president and general manager of the Glen Alden Coal Co.; C. S. Newhall, Philadelphia, vice-president of the Pennsylvania Company, Jervis Langdon, Elmira, N. Y., P. S. Gardner, New York City, mining engineer, and W. H. Johns, of Wilkes-Barre. The Shamokin company will operate a tract believed to contain 16 beds with 12,000,000 tons of recoverable coal. A first mortgage 6½ per cent bond issue has been offered to the public to raise funds for purchasing and installing new equipment.

VIRGINIA

The new \$2,000,000 coal pier of the Virginian Ry. at Sewalls Point will be ready for operation Sept. 1, according to an announcement by C. H. Hix, vice-president of the Virginian. The new pier will be electrically operated and will have a number of innovations in coal handling. It will be self-trim-

ming, and its hoist will have a capacity of two cars at a time. In all its facilities the new pier will be one of the most modern in the world.

WEST VIRGINIA

Bids are being asked by the Chesapeake & Ohio Ry. for building of 1,000 hopper-bottom steel railroad cars. The president, W. L. Harrahan, expects to have some of these ready to help in moving peak traffic in the fall of this year.

Chief Lambie held the third of his series of safety meetings at Beckley, Aug. 1, C. R. Stahl, assistant general manager, E. E. White Coal Co., being chosen chairman. Carl Scholz, vice-president and general manager, Raleigh-Wyoming Coal Co., presented information regarding electric cap lamps.

Officials of the A. L. Black Coal Co. and the Warner Collieries Co. in the Monongalia field will co-operate in further efforts to extinguish a mine fire which has been burning in the Black mine for several years. This fire endangers the holdings of the Warner company which has property on three sides of the Black mine. R. M. Lambie, chief of the department of mines, has recommended sealing and flooding, the stripping of coal in the rear of fire and the erection of a concrete firewall. Previous flooding failed to extinguish the fire owing to old connections with the Warner mine.

C. E. Lawall, assistant professor of mining engineering in the University of West Virginia, at Morgantown, has been designated acting head of the department with rank of associate professor. He will succeed A. C. Callen, now dean of mining at the University of Illinois. Thomas Frazer, formerly with the U. S. Bureau of Mines, and temporarily assigned to the assistant professorship of research work at the University of Illinois will replace C. E. Lawall who has been with the engineering department since 1921. Professor Lawall is a graduate of Lehigh University.

Associated with the West Virginia Coal & Coke Co. of Elkins, W. Va., in the purchase of the Main Island Creek coal mines reported in *Coal Age*, July 31, p. 160, are the Logan Mining Co., the Empire Coal Co. and the Rich Creek Coal Mining Co. It is said that the sales price for the Main Island Creek interests was about \$4,500,000 plus the inventory of the stores, commissaries and a knock-down price on other holdings.

The tippie at the Whiteman mine of the Clarksburg Big Vein Coal Co., a company operating on a non-union basis and employing 60 men, was wrecked Aug. 7 by two explosions. Timbers were hurled more than 300 ft. and nearby homes were shaken. This is the third tippie destroyed in the last few weeks at the non-union mines of Harrison County.

The Crystal Block Coal & Coke Co., Welch, W. Va., has voted to issue \$200,-

000 of preferred stock, to complete the development of a new operation at Stirrat in the Logan field on Main Island Creek, making total capital \$700,000. It will be one of the best operations in southern West Virginia and well equipped with preparation machinery. The company has about 1,300 acres and has already completed work on 34 houses and driven its opening about 600 ft. The company expects to ship coal in small quantity in about two weeks.

CANADA

It having been alleged by an alderman of the City of Hamilton, Ont., that the municipal coal department conducted by that city this year was incurring heavy loss, the City Clerk has made a statement that up to June 1 a surplus of \$2,300 has been earned.

Archibald McCool, general manager of the British Empire Steel Corporation's operations on the mainland of Nova Scotia, has resigned his position.

The British Empire Steel Corporation has announced a decrease in salaries ranging from 10 to 25 per cent, for executives of the company. Affected are superintendents, engineers, foremen, office managers, purchasing agents, office clerks and shipping department employees, etc. Some of the principal officers have resigned in protest against the cuts. Because of the shutdown of the steel plant at Sydney for three months, a substantial decrease is expected for the next three months in the coal mined in the Cape Breton district.

The Allen mine which was the scene of a disaster on Cape Breton island some months ago, has been closed, apparently for an indefinite period. No repairs are being made. The production of coal by the British Empire Steel Corporation, is about sixty per cent normal. This is attributed to the depression in business. At nearly all the mines are heavy stocks of coal awaiting sales.

New Companies

Articles of incorporation have been filed in Birmingham by the **Continental Coal Co.**, with a capital stock of \$4,800, all paid in. The company was formed by T. S. Abernathy, G. G. Tait and J. M. Donaldson.

The **Jagger Coal Co.**, Nauvoo, Ala., has filed notice decreasing its capital stock from \$198,000 to \$20,000.

The **Castlegate Fuel Co.** of Salt Lake City has filed incorporation articles. Chas. M. Goddard is president. The capital stock is listed at \$25,000.

The **Mutual Development Co.**, of Pikeville, Ky., for development of coal properties, was recently chartered with a capital of \$75,000, by J. J. Moore, L. H. Moore and Edward Hellier.

The **Northern Alabama Coal Co.**, Jasper, Ala., has filed papers for incorporation permitting it to enter the coal-mining business. The incorporators are Walter Moore, C. P. Moore and Bird Tichenor. The capital stock is \$247,500, only \$2,500 of which is paid in.

The **Peerless Elkhorn Coal Co.**, of Columbus, Ohio, has been incorporated with an authorized capital of \$150,000 to mine and sell coal in the Elkhorn field of Kentucky. Incorporators are F. G. Hatton, E. Hauck, Ralph G. Martin, Ralph E. Marburger and

Ralph E. Weaver. The promoters are not yet ready to announce the details of the development.

The **Youngstone Coal Co.** has just been launched with a view to engaging in the production of coal in northern West Virginia. This company is capitalized at \$100,000. The headquarters of the concern are at Morgantown. Having an active part in forming the new company were: Erwin B. Stone, W. D. Stone, E. B. Stone, Sr., F. A. Stone, and Ethel Stone all of Morgantown.

Huntington people have organized the **Alma Pond Creek Coal Co.**, with a view to developing an acreage of coal in the Thacker field near Sprigg, W. Va. The new concern is capitalized at \$150,000. The office of the company will be at Sprigg. Principally interested in the new concern are H. L. Rucker, R. C. Pforr, P. P. Gibson, D. G. Hughes and M. F. Breslin, all of Huntington, W. Va.

Industrial Notes

The **Maine Electric Co.**, manufacturer and distributor of steam and electric hoists and derricks, coal-handling plants and marine auxiliary machinery, has opened a Philadelphia office at 814 Walnut Street, Philadelphia, Pa. The new office will be in charge of F. V. Wetherill.

J. F. Buhr has opened an office in the Blodgett Engineering & Tool Co. Bldg., at 14th and Dalzelle Sts., Detroit, Mich. The J. F. Buhr Machine Tool Co. will act as sales representatives for the Blodgett engineering and tool products.

H. M. Richards was recently appointed district manager in charge of the Cleveland district office of the **American Rolling Mill Co.** For a number of years he was located at the home offices of the company, and in recent years has been attached to the Pittsburgh district office. J. T. Hagan, of Cleveland, is associated with Mr. Richards in his new work, and the office is now at 1408 B. F. Keith Building.

The **Chicago Pneumatic Tool Co.** announces the transfer of Ross Watson, formerly district manager of the Cleveland office of this company to the district management of the Minneapolis branch to succeed D. M. Westbrook, now general manager of the Canadian Pneumatic Tool Co. Other recent changes include the transfer of L. J. Westenhover, from the Pittsburgh Office to Cleveland as District manager of that branch and E. C. Stroup, compressor engineer in the Boston territory, has been moved to the Pittsburgh District.

Peter G. Rimmer, for many years in charge of the Wilkes-Barre office of the Ridgway Dynamo Co., has resigned the position which he has held for the last two years with the Scranton Electric Construction Co., and on July 1 again took charge of the Ridgway office at Wilkes-Barre. E. W. Quiggle, who has been in charge of the Wilkes-Barre office during Mr. Rimmer's absence, is returning to the factory office at Ridgway, Pa.

The Buffalo office of the **Cutler-Hammer Mfg. Co.**, located in the Ellicott Square Bldg., formerly a part of the Eastern district, has been made part of the Central district, of which A. G. Pierce is general district manager, with headquarters at Pittsburgh. The Central district includes the territories covered by the Buffalo, Pittsburgh, Cleveland and Cincinnati offices. B. A. Hansen is manager of the Buffalo office.

Association Activities

The annual banquet of the **Virginia Coal Operators' Association** at Norton was attended by about 150 operators and guests. Horace Williamson, of Cincinnati, presided. Harry L. Gandy, of Washington, executive secretary of the National Coal Association, the principal speaker, urged open frankness in meeting and dealing with the problems of the coal industry. He asserted that the fourth amendment to the federal constitution guaranteed the right to peaceful possession of private property, free from aimless fishing and probing, assuring his hearers that the National Association had justified its existence in challenging through the Maynard case the federal right of indiscriminate interference with private industry, if by nothing else that it has done.

Traffic News

Make More Protests Against Northwest Rate Revision

Almost every day some new party enters the lists against the rate revision on Illinois rail coal for the Northwest which the Interstate Commerce Commission has ordered for Sept. 10. The Wisconsin Traffic Bureau of Chicago, representing a large group of paper interests, has filed the latest petition with the Commission for a re-opening of the case. Other recent ones were filed by the Waldorf Paper Products Co., of St. Paul, Minn., the Hydraulic Press Brick Co., of Minneapolis and the Twin City Coal Exchange. Up to August 1 the Commission had stood pat, however, so carriers are preparing to advertise the new tariffs.

Indiana Rate Is Upheld

The carriers of Indiana failed to get the federal court to uphold them in their desire to maintain the present Indiana intrastate rates on coal. So the new low tariffs ordered for Aug. 1 by the Indiana public service commission took effect that day. Judge Samuel Alschuler, one of the three federal judges who sat *en banc* on the railroads' appeal for an injunction against the state commission, charged the roads with "panhandling" their case about from court to court in an effort to find one that would favor them. "You are bound by the decisions of the Indiana Court," he said. The state courts had already declined to interfere in the case. The roads are now petitioning the I.C.C. to interfere.

Fifty manufacturers in the Rock Island-Moline (Ill.) region are asking the State Commerce Commission for reductions in intrastate rates on coal to those cities. They point out that many other regions have recently been favored with rate cuts.

The application of the City of Watertown, S. D., for a suspension of the increased freight rates on coal to Watertown and other South Dakota points, in connection with the new rates on steam coal, has been refused by the Interstate Commerce Commission.

Recent Patents

Mining Machine. Edmund C. Morgan, Chicago, Ill.; Olive E. Morgan, executrix of Edmund C. Morgan, deceased; 1,480,003. Jan. 8, 1924. Filed Jan. 5, 1916; serial No. 70,341.

Spiral Lowering Chute. Frank Pardee and Frank Pardee, Jr., Hazleton, Pa.; 1,480,105. Jan. 8, 1924. Filed April 28, 1922; serial No. 557,063.

Scraper. Leslie P. Green, Chicago, Ill.; 1,480,389. Jan. 8, 1924. Filed June 24, 1921; serial No. 479,991.

Crossover Mine Switch. Robert T. Bagby, Birmingham, Ala., assignor of one-half to E. M. Kilby, Birmingham, Ala.; 1,480,739. Jan. 15, 1924. Filed June 9, 1923; serial No. 644,343.

Electric Accumulator or Battery for Miners' Safety Electric Lamps. Richard Koch, Pittsburgh, Pa.; 1,480,764. Jan. 15, 1924. Filed Feb. 9, 1923; serial No. 617,980.

Mine-Door Operating Apparatus. Harry Frank and John Lewis, Fork Ridge, Tenn.; 1,481,128. Jan. 15, 1924. Filed April 13, 1922; serial No. 552,119.

Scraper Bucket. Harry A. Roe, Chicago, Ill.; 1,481,273. Jan. 22, 1924. Filed Dec. 23, 1920; serial No. 432,667.

Grate Bar to Burn Pulverized Coal. Francisco Herkenrath, Santiago, Chile; 1,481,366. Jan. 22, 1924. Filed Nov. 1, 1921; serial No. 512,075.

Treating of Coal and Manufacture of Briquets. Charles V. McIntire, East Orange, N. J., assignor to International Coal Products Corp., Bristol, Va.; 1,481,427. Jan. 22, 1924. Filed Aug. 9, 1920; serial No. 402,168.

Treating of Coal and Manufacture of Briquets. Chas. H. Smith, Short Hills, N. J., assignor to International Coal Products Corp., Richmond, Va.; 1,481,627. Jan. 22, 1924. Filed Aug. 9, 1920; serial No. 402,153.

Mining-Machine Truck. Roy Norman, St. Louis, Mo., assignor to the Sullivan Machinery Co., Chicago, Ill.; 1,483,053. Feb. 5, 1924. Filed May 19, 1922; serial No. 562,231. Renewed June 18, 1923.

Apparatus for Blasting by the Use of Electricity. John H. Bills, deceased; Mollie R. Bills, administratrix, Denver, Colo.; 1,483,209. Feb. 12, 1924. Filed June 12, 1922; serial No. 567,777.

Runner or Guiding Means of Mine Skips, Cages and Other Vehicles Employed in Vertical Shafts. G. W. Sharp, Johannesburg Transvaal, South Africa; 1,485,302. Feb. 26, 1924. Filed Aug. 31, 1922; serial No. 585,437.

Obituary

Grant Hubley, vice-president and director, Greensburg-Connelville Coal & Coke Co., died July 20 of injuries received in an automobile wreck June 30. He was vice-president and general manager of the Oil Well Supply Co., of Pittsburgh.

George W. Atkinson of Louisa, Ky., died late in July at a Huntington, W. Va. hospital to which Mr. Atkinson had been removed after a few days' illness at his own home. He had, however, been in poor health for some time. Mr. Atkinson was 56 years of age.

For many years he had been identified with the coal industry of southern West Virginia, being originally identified with the Flat Top Coal Co., now the Pocahontas Coal & Coke Co. Later he was associated with the Guyan Coal Land Co. in Wayne county, a subsidiary of the Flat Top Coal Co. Mr. Atkinson organized the Williamson Light and Power Co. and also the Logan Light and Power Co. He was at the time of his death, owner of the water works at Louisa.

Mr. Atkinson was a graduate in civil and mining engineering of the Virginia Polytechnic Institute of Blacksburg, Va., and a native of Montgomery County, Va.

Coming Meetings

New York State Coal Merchants Association, Inc., 14th annual convention, Sept. 4-6, Stamford-in-the-Catskills, N. Y.; headquarters Churchill Hall. Executive secretary, G. W. F. Woodside, Arkay Building, Albany, N. Y.

American Chemical Society. Fall convention Sept. 8-11, 1924, at Ithaca, N. Y. Secretary Gas and Fuel Section, O. O. Malleis, the Koppers Co., Pittsburgh, Pa.

Oklahoma Coal Operators' Association. Annual meeting Sept. 11, 1924, McAlester, Okla. Secretary, A. C. Casey, McAlester, Okla.

Association of Iron and Steel Electrical Engineers. Annual meeting and exposition at Duquesne Garden, Pittsburgh, Pa., Sept. 15-20. Secretary, John F. Kelly, 1007 Empire Bldg., Pittsburgh, Pa.

National Safety Council. Thirteenth annual safety congress Sept. 29 to Oct. 3, Louisville, Ky. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

American Institute of Mining and Metallurgical Engineers. Fall meeting, Birmingham, Ala., Oct. 13-15. Secretary, F. F. Sharpless, 29 West 39th St., New York City.

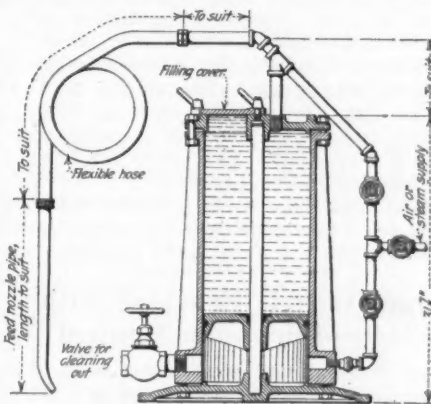
American Institute of Electrical Engineers. Fall convention, Pasadena, Calif., Oct. 13-17. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

New Equipment

For Spraying Surfaces

Many walls should be sprayed to make them airtight. No stopping, no furnace wall is tight if made out of brick and not coated with some kind of plastic material. The equipment illustrated is designed to spray plastic material on boiler baffle walls but it has other uses. It may be used to patch roofs and walls of furnaces of all kinds. It can be operated by air or steam pressure; the movable bottom lifting under pressure and expelling the liquid.

By means of a pipe leading direct to the hose any material clogging the hose or nozzle can be blown out by air or steam whichever furnishes the power for the operation of the machine. The long nozzle places the material in the most inaccessible places in either hot or cold furnaces. With this type



Sprayer for Plastic Material

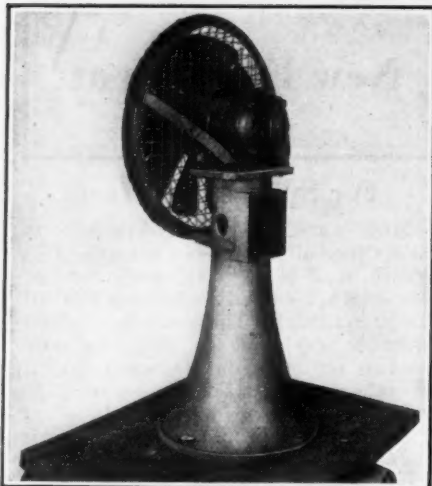
The cylinder rapidly is filled with the plastic mixture through the cover at its top. This is replaced and screwed down. Air or steam is admitted below the piston and the liquid above it is expelled under pressure into the hose and nozzle.

of equipment labor is saved and the time lost in shutting down for repairs. The equipment is made by the Co-operative Utilities Co., 1014-1015 Harrison Building, Philadelphia, Pa.

Man-Cooling Shop Fan

Hot work is a trial in warm weather. Many a blacksmith or foundry man would do better work if kept cool by a fan. Any kind of shop man will be better contented and more active if given a breath of fresh air in warm, humid weather. A man-cooler has been developed by the Buffalo Forge Co., of Buffalo, N. Y. This unit is made in two sizes, the larger having a 36-in. diameter fan wheel, and the smaller a 30-in. wheel. The entire fan is of heavy construction to insure against vibration. The screen inclosing the fan wheel is extra heavy, and the rim itself is made of 2½ x 2½ in. angle. The unit, however, can be moved easily.

This fan has only three essential parts—the fan wheel, a direct-connected motor, and a pedestal. The wheel is



Fan Cools Shop in Hot Weather

Blades revolve at speed of 900 r.p.m. Screen is heavy with strong rim. Made for the rough usage likely to be sustained by a shop fan.

composed of ten blades so designed that the air is delivered in a concentrated stream. This factor of air delivery gives the best cooling efficiencies at the lowest expenditure of power. A direct-connected motor placed directly back of the fan wheel supplies the motive power. The 36-in. man-cooler fan is supplied with a 5-hp. motor, and the smaller fan is equipped with a 3-hp. unit. The speed for fans is 900 r.p.m. The pedestal is a heavy casting; four bosses are provided in the base for foundation bolts in case the fan is kept in a permanent location.

Mine Hoist Is Provided with Electro-Pneumatic Control

An unusual and interesting type of control for a large mine hoist will be put in operation in the early part of this coming autumn by the Lehigh Coal & Navigation Co., Lansford, Pa., at its No. 4 shaft. The installation will consist of a 1,200-hp. 300/293 r.p.m., 2,200-volt, three-phase, 25-cycle, wound-rotor induction motor, which will be controlled by electro-pneumatic-unit-switch type of contactors. Each contactor is closed by air pressure against a powerful spring, the action of which produces positive closing and a quick break when opening.

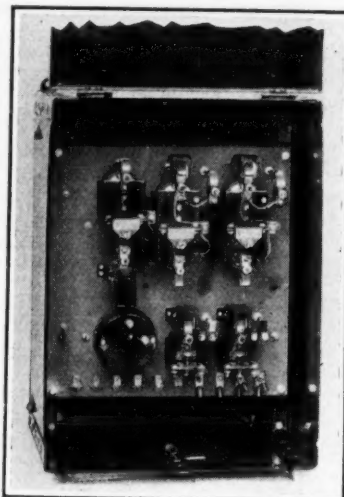
The primary reversing contactors will consist of three 2-pole elements, electrically and mechanically interlocked and mounted on a steel supporting frame, totally inclosed. The inclosing covers will be provided with a specially designed muffler to deaden the noise, characteristic of all high-voltage air-break contactors. The secondary accelerating contactors will consist of twenty-four unit switches mounted on three separate steel frames, giving nine accelerating points. These contactors will not be enclosed, as the only noise is that accompanying the escaping air when the contactors open. Because of the noiseless operation of the accelerating contactors and their separation into three frames they can be mounted near the motor with the grid resistors and thus utilize waste space which will result in a material saving in the cost of installation.

The action of the electro-pneumatic contactors is governed by the manipulation of a small master controller, the contacts of which control an electrically operated air valve on each unit switch. Automatic acceleration is obtained by current-limit accelerating relays and interlocks so that each switch will operate in the proper sequence without excessively high currents.

Every safety feature is provided for the successful operation of the complete equipment. The failure of the alternating-current power, the air pressure or the control circuit, or the occurrence of an overtravel will immediately open all main switches and apply the hoist brakes. This control is being furnished by the Westinghouse Electric and Manufacturing Co.

Machine-Tool Controllers for Direct-Current

Magnetic machine-tool controllers recently have been placed on the market, employing the counter-electromotive force method of acceleration. These controllers are applicable to both reversing and non-reversing, constant



Reversing Type Controller

Acceleration is governed by the counter-electromotive force generated in the motor.

and adjustable speed drives requiring normal starting conditions. They have been developed primarily for application to direct-current motors in sizes ranging up to and including 15 hp.

The controller provides two accelerating points; the starting resistor is automatically short-circuited in one step upon proper acceleration of the motor. This is accomplished by an accelerating contactor the closing of which is governed by the counter-electromotive force of the motor.

These controllers are made by the General Electric Co. Coincident with the adoption of the new type of starter for its smaller motors, a complete redesign has been made of its larger types of magnetic machine tool and general purpose controllers.

Low Switch Stand Has Throw Parallel to Track

A longitudinal-throw switch stand of low height and simple construction recently has been patented by Louis A. Green and will shortly be placed on the market by the L. A. Green Railway Equipment Co., of Pittsburgh, Pa. In the design of this stand the object sought was the provision of a simple, durable device of small first cost, particularly adapted to use in the restricted passages of mines, tunnels and the like.

In detail this stand consists of four chief parts, namely: (1) A stand or support, (2) a hand lever pivoted at one of its sides, (3) a link or lever connecting this hand lever with (4) a vertical shaft, provided at its lower end with a crank that engages a link or connecting rod joining it to the bridle bar of the switch.

As may be seen in the accompanying illustration the vertical shaft which is pivoted to the stand at its upper end is slotted. Through this slot works the lever which joins this shaft to the hand lever, which latter is curved slightly inward at its lower end. The arrangement is such that in either the open or closed position of the switch the hand lever, which is usually weighted, lies parallel with the ground.

It is usually conceded that a longitudinal or parallel-throw switch is safer than one having a transverse-throw, for in working the lever the switchman is not compelled to reach near the track to either raise or depress the lever. He is thus at a safe distance from the locomotive or trip at all times, and is not liable to pitch forward over the track. Furthermore, a low stand such as this one does not offer an appreciable obstacle to passage through a heading in which a trip is standing.

Switch of Simple Construction And Minimum Height

The simplicity of this switchstand is apparent at once — and simplicity means both reliability and low first cost.

